

COAL AGE

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No. 16

Mr. Mine Manager, what do you know about mine rolling stock?

When you purchase mine car wheels, these days, you are not limited to one type of wheel, as you were some half dozen years ago; you may make your choice, for instance, from at least a dozen different designs of self-oiling wheels; probably an equal number of roller-bearing patterns, to say nothing of ball bearings and others.

Have you, at your finger ends, any positive information that would justify you in eliminating some of these types from consideration and allow you to choose intelligently from the balance?

To be more specific; let's assume that in one of your mines you have a long motor haul where you are now pulling your cars at the rate of about five miles per hour. It appears that because of the rapidity with which you are driving the narrow work, that it will soon be necessary to increase your haulage speed to eight miles per hour, and, eventually, to twelve miles per hour. Do you know whether the wheels you now have in service on your mine cars, will stand up under such speeds; and, if not, do you know of any type of wheel that will?

Let's go a little farther. Do you know whether it costs more to lubricate the self-oiling wheels, using black oil

than the roller-bearing and ball-bearing wheels that require an entirely different kind of lubricant?

Do you know the difference in draw-bar pull between cars equipped with any one of the types of wheels mentioned, in contrast to any other one type.

Have you any figures showing the comparative life of any two of the types of wheels mentioned? Do you know whether some of these types are especially adapted to slope hauls, while others are peculiarly adapted to practically level hauls?

Come now—fess up; you need not be ashamed of your ignorance! Listen to this:

So far as we are aware, not a single mining corporation has covered such an investigation, intelligently and fully—or at least, if they have, they have not seen fit to take the mining fraternity into their confidence.

Surely the inventors of these different types of wheels are deserving of some kind of a hearing; and as for the owners of our mining property, you know they need all the dollars that can be wrested from present cost sheets.

Get busy: If we have misstated your experience, tell us so emphatically; we won't take offense.

Ideas and Suggestions

Getting Results

BY WILLIAM H. SCHAEFFER*

An intelligent imitator always gets *some* results. He is up and doing while the other fellow, hoping to find a file of Original Ideas dropped upon his desk, finds himself shriveling up in the Chair of Opportunity.

Action generates originality, and it takes originality to imitate, paradoxical as that may seem. The original man takes an original way to better results. The old way was to survey the road yourself and erect from personal experience the necessary guide posts. The new way, the original way, is to study first the accounts of the journeys that other men have made over the same ground, marking down in your mind the pitfalls, the soft spots, and the treacherous places that they have encountered, and then going ahead and side-stepping all of these known difficulties. Then when the unexpected difficulty comes, you can meet it more easily because it was the *only* obstacle you didn't know about and you have conserved your full strength to concentrate upon it.

You never will find two problems in real life identical. The art of adapting to one business the principles developed in another seems to be the fountain of efficiency, and is actually as simple as A. B. C. On that idea alone, efficiency engineers have enabled themselves to really earn big remunerations from shrewd business men, who failed to grasp the simple idea involved.

Individual experiences are but illustrations of the application of the principle they strive to carry home. Don't hitch the cart before the horse and regard the principle as the example and the experience as the fundamental truth involved. That's what the fellow is doing who is up against the problem that is "so different."

The same principle is now being adapted to coal mining and if by a study of technical literature, you dig for ideas as conscientiously as you dig for coal, you won't be covering the road of Progress between Here and Best Results without knowing before you start the maps that others have laid out in the territory affected.

Surface Steam-Line Supports

The accompanying illustrations show the method adopted in the Norrie group of mines at Ironwood for supporting an outdoor steam pipe. The steam is conveyed some distance from the boiler house to the hoist at one of the shafts. The pipe is carried on the structural-steel bents shown in order to maintain the desired grade over the variable ground.

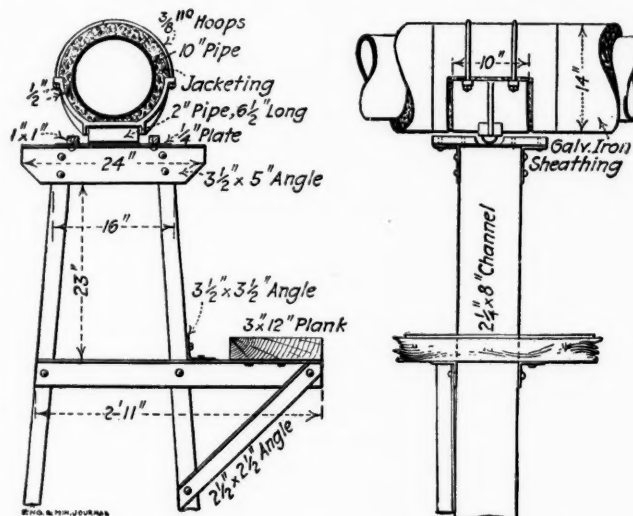
The bents are spaced about 15 ft.; every 200-ft. approximately a slip joint is inserted to take care of expansion. This is carried on the structure shown near the center of the photograph. The bents are set on concrete foundations to which they are held by plates bent at an angle, riveted to the legs and bolted to the concrete. The 3x12-in. plank

supported on angles along one side, serves as a walk when it is necessary to inspect the pipe or pack the slip joints. The cross-braces are spaced 3½ ft. center to center and as many are used as the height of the bent requires.



PIPE LINE FROM THE BOILER HOUSE

The manner of holding the pipe on the top of the bent so as to permit longitudinal motion, is of interest. The pipe is jacketed with insulating material and sheathed in galvanized iron wired on. A cast saddle at each bent is



TOP OF A BENT, SHOWING SADDLE AND ROLLER

bolted to the bottom of the pipe with two 3/8-in. bolts, over the top. The bottom of this casting is a socket which fits over a short section of 2-in. pipe. This pipe acts as a roller; it is free to roll longitudinally on a plate which forms the top of the bent, but is held against lateral motion by 1x1-in. pieces riveted to the plate. The details of construction of the top of the bent are evident from the drawing.—*The Engineering and Mining Journal*.

*Akron, Ohio.

Cost Sheets--Their Uses and Their Limitations

BY J. B. DE HART*

SYNOPSIS—The daily cost sheet, while indispensable to the mine foreman as a record of the daily expenditures of the company, is, necessarily, an imperfect record of the production cost and should, therefore, be supplemented by a weekly or fortnightly cost sheet.

The output of most coal mines includes a daily cost sheet. Let us consider for a few moments what this record shows, and of what use it is. In the first place, the term "cost sheet" is liable to be misleading. A daily cost sheet does not, and never can, show the actual cost per ton of coal mined. What it does show is the daily expenditure of the company and the way in which this money has been spent. A glance at the figures at the end of a cost sheet, "total cost \$x. per ton," shows us simply nothing. In order to be in a position to use the cost sheet to the best advantage we must first come to a realization of this fact, and we must also learn whence the inaccuracies arise.

Let us first consider the item "Mining Materials," which includes timber, rails, pipes, planks, sheet iron, and so forth. The supply of timber which is sent down a mine each day does not vary to any large extent, except as the mineral output varies. At most mines, however, rails are sent down not every day, but once in about every three days. The usual method of procedure is for the foreman to write an order on the warehouse for the rails, and the cost of these is charged against the output of the mine on the day when the order was written, shown by the date on the order.

Clearly these rails should have been charged against the total output for the three days, and not against the production of any single day. If they are room rails, or rails not used in a main entry, they will be taken up and used over and over again, and so will help to produce a large amount of coal. Yet, on the cost sheet, they are charged against the output of a single day.

OVERCOMING THE DIFFICULTY

The question naturally arises, "How can we overcome this difficulty?" Clearly, it is impossible to postpone the making up of the cost sheet until the rails are worn out, or buried beyond hope of recovery. The best we can do is to get out a cost sheet covering all three days, and such a plan will eliminate the greater part of the error. This is a simple matter, and hence we find at most mines, not only daily, but also weekly or fortnightly cost sheets. Such cost sheets show a much nearer approximation to the cost per ton for a given period, although they are not absolutely accurate.

Let us suppose that there is a cave on one of the main roads, and that it takes a week to have it repaired. This work is usually charged to the output for that week, and, other things being equal, we get a too high cost per ton for that week. To be accurate we should spread the cost for this work over the whole output for a period equal to the average time which elapses between the days when we spend a week repairing caves. For example, if we, at the end of a year, have spent one week only repairing

such caves, then the cost should have been borne by the whole year's output; if we have spent four weeks at such work, then the cost of the one week should have been borne by the output for three months. It is as well to realize this fact; that even a fortnightly cost sheet does not show an absolutely accurate cost per ton. Nevertheless, a fortnightly cost sheet does under ordinary circumstances show a cost per ton which is accurate enough for all practical purposes.

In spite of its defects, a daily cost sheet is indispensable to the mine manager. It must be looked upon, however, as showing the distribution of labor cost, and not the true cost per ton, or the cost per ton of material. It shows us the disposition of the forces; it shows the proportion of shiftmen to miners, of undercutters to miners, and the output per miner and per man. With all of these facts the mine manager must be familiar in order to cut down expenses to a minimum. On the other hand, we must always bear in mind that it is necessary to look further into the matter than the figures shown by the daily cost sheet, before we can confidently go to the mine and say to the foreman, "Your cost for material is going up."

Dewatering Coal after Washing

One of the most difficult problems in connection with coal washing, in the past, has been the dewatering of the coal, after finishing its treatment in the washer. This difficulty seems now to have been successfully overcome by two companies; namely, the American Concentrator Co., of Joplin, Mo., and Springfield, Ohio, and the Link Belt Co., of Chicago, Ill.

Each of these companies has been experimenting with machines, during the past year, and they have now reached a point in their investigations where they are accepting orders.

The American Concentrator Co. installed their experimental dryer at the plant of the Pennsylvania Steel Co., at Steelton, Penn., last summer, and now, within a month, will have two large washer installations in operation using their machines; one in Alabama and one in Pennsylvania.

The Link-Belt experiments were carried on at the plant of the Illinois Steel Co. and they have recently closed a contract for a plant in Alabama, which calls for the installation of their dryers.

Both machines are centrifugal in action, and, their makers claim, will deliver coal after treatment with a uniform moisture content not to exceed 6 per cent. Heretofore, the owner of a washery had his choice of storing his washed coal in bins, for several days, and then elevating it with cranes and grab buckets, or else taking it directly from the so called dewatering elevators, with its moisture content varying anywhere from 7 to 20 per cent.

Another advantage which will, no doubt, accrue from the use of these dryers, will be the entire recovery of the very fine coal that ordinarily floats off with the waste water.

Development along this line will be followed with a great deal of interest by all who are interested in coal washeries.

*Coleman, Alta, Canada.

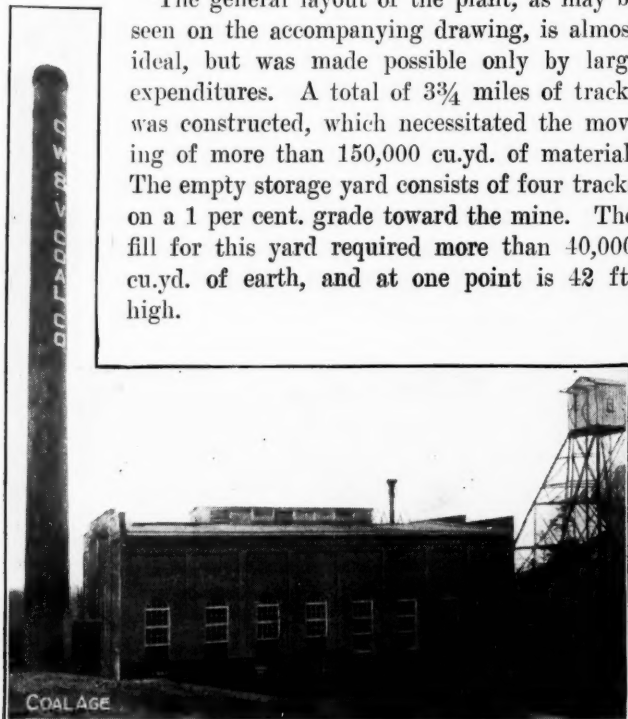
A Modern Illinois Coal-Mining Plant

By R. G. READ*

SYNOPSIS—A Southern Illinois coal-mining plant where the machinery and equipment are thoroughly up-to-date.

The new plant of the Chicago, Wilmington & Vermilion Coal Co., located at Orient, on a spur connecting with the Chicago, Burlington & Quincy, and the Chicago & Eastern Illinois Rys., is the first of a series of plants to be constructed for the development of a tract of 7000 acres of coal owned by this company in Denning Township, Franklin County, Ill.

The general layout of the plant, as may be seen on the accompanying drawing, is almost ideal, but was made possible only by large expenditures. A total of $3\frac{3}{4}$ miles of tracks was constructed, which necessitated the moving of more than 150,000 cu.yd. of material. The empty storage yard consists of four tracks on a 1 per cent. grade toward the mine. The fill for this yard required more than 40,000 cu.yd. of earth, and at one point is 42 ft. high.



GENERAL VIEW OF THE POWER PLANT

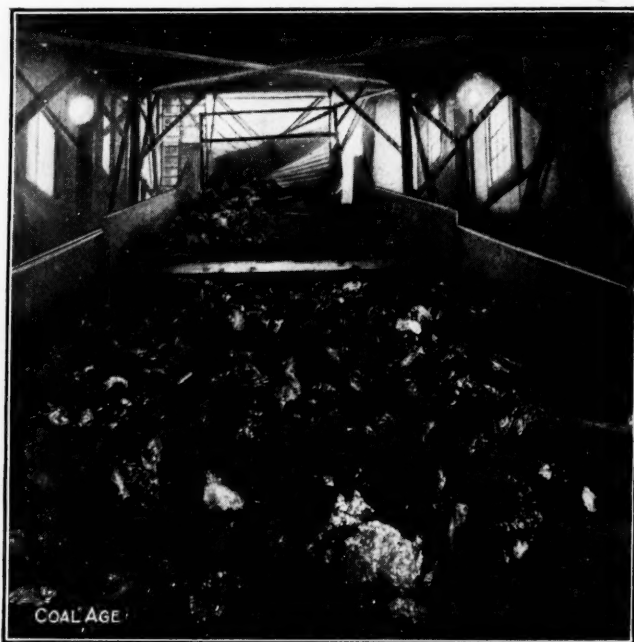
The shaft is 520 ft. deep, and the point of dumping in the tippie is 70 ft. above the ground surface, making a total lift of 590 ft. Separate hoisting and air shafts have been constructed, each being 11 ft. 6 in. by 18 ft. in the clear and lined with 10-in. reinforced concrete extending from the surface to the bottom of the shaft. The air shaft, furthermore, has a reinforced-concrete partition separating the airway from the stairway compartment. An auxiliary hoist for men and material will be here installed.

The town site is located on rolling ground, and is pro-

*Webster Bldg., Chicago, Ill.

vided with modern conveniences, including electric light and running water in each house. A hotel and 75 dwellings have already been completed.

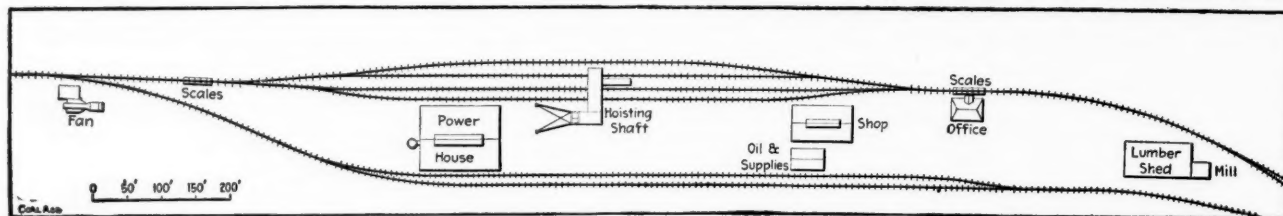
The mechanical equipment was designed for a working capacity of 4500 tons per day of eight hours. In order to handle this output it was realized that a maximum hourly capacity of 1000 tons would have to be attained. The hoisting and screening equipments were, therefore, designed with this end in view. Special attention was given to simplicity and strength of the various machines, so that the risk from delays due to breakdowns would be reduced as far as possible. The question of economy in power consumption was also given careful



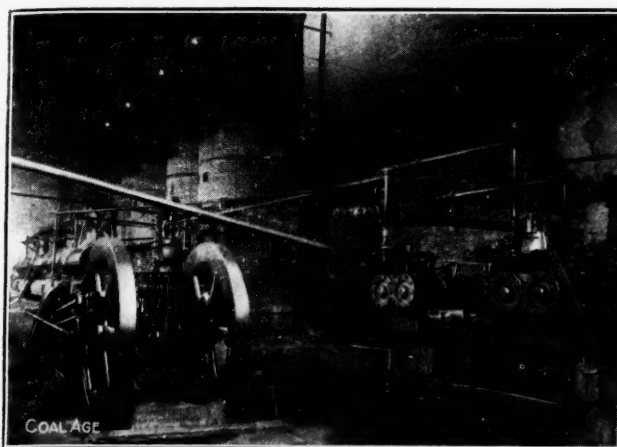
VIEW OF THE SHAKING SCREENS

consideration, with the result that the steam consumption per ton of coal produced is small.

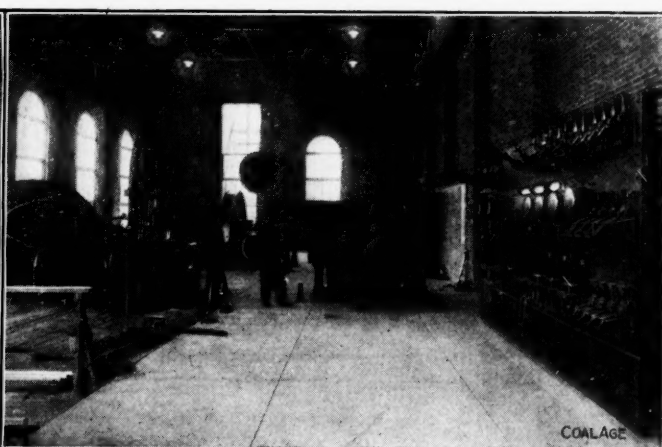
The tippie and screening equipment was given much thought with a view to thorough preparation of the coal. A side elevation of the tippie is shown in the accompanying drawing. The plan adopted for the mine rendered it desirable to place the hoist at right angles to the screen. The coal is dumped by means of self-discharging cages into a chute from which it flows by gravity into a weigh-hopper, provided with automatic recording scales and an electrically operated gate through which it is discharged into a "spiral" chute 10 ft. wide. This provides both a means of bringing the coal to the center line of the



GENERAL LAYOUT OF THE MINE TRACKS AND BUILDINGS



A VIEW IN THE BOILER ROOM



THE HOIST AND GENERATOR ROOM

screen and a considerable amount of storage with a minimum of breakage.

This storage (about 20 tons) enables the dumping to proceed when the screens are for any reason momentarily stopped. A reciprocating motor-driven feeder which may be stopped or started at will delivers the coal to the screen.

The screens themselves which are perhaps the largest ever constructed are 10 ft. wide, each, with one perforated and one blank deck. No veil plates have yet been used for making the several mixtures indicated on the drawing. A separate steel structure supports the oscillating parts so that vibration is not transmitted to the hoisting tower or tippie building. A run-of-mine bypass chute independent of all machinery is provided for use in case of emergency.

The picking equipment consists of two 4-ft. tables of the apron type for the egg and nut sizes. Each table is about 25 ft. long and is carried by an independent steel frame. These tables are pivoted and provided with a hoisting mechanism so that they can be raised to discharge into chutes leading to box-cars when desired.

The refuse removed from the coal in the picking oper-

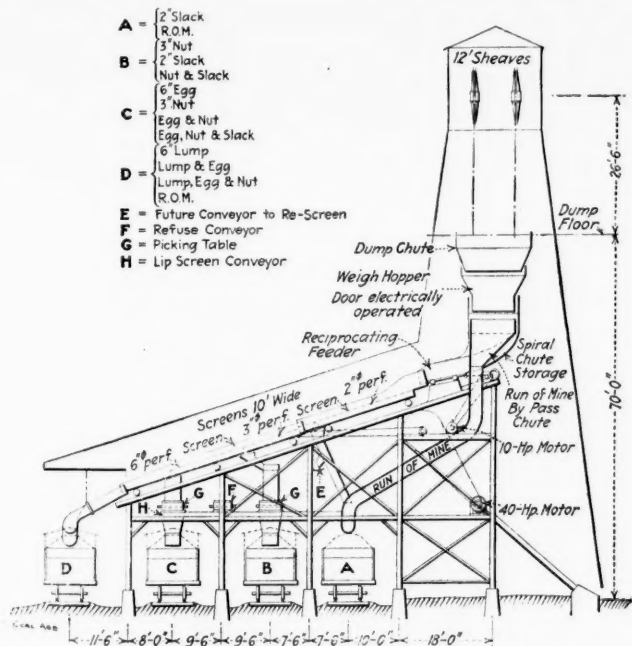
ation is thrown upon an apron conveyor and discharged into a 50-ton bin over the egg track. For all of these conveyors separate motor drives are provided. A combined picking table and loading boom for the lump coal will be installed in the future as well as a rescreening plant for separating the small sizes. The high class of construction of this machinery may be judged from the accompanying photographs.

The power house is a brick building, 90x114 ft., with steel roof and concrete floors. The boiler plant proper at present consists of four 400-hp. Wickes vertical water-tube boilers fired by Green chain-grate stokers. Provision is also made for adding two more future boilers which will bring the total capacity up to 2400 hp. Brick flues or smoke ducts connect the boilers to an 8x175-ft. Weid-erholt reinforced-concrete stack. A tunnel has been built for the handling of ashes, and a coal-handling equipment with a bunker is to be installed in the future.

The hoisting engine, which is located in the power plant proper, is a duplex Nordberg Corliss 28x48 in., driving a 10-ft. drum. This is believed to be the first engine of this type to be installed in this field. The electric energy is furnished to the mine by a 300-kw. Crocker-Wheeler generator direct connected to 22x30-in. Nordberg Corliss engine. Space is provided for two similar additional units. A 35-kw. generator for lighting is also installed so that the large unit is used only during working hours. A small air compressor is also provided for cleaning boilers, riveting, etc.

A Jeffrey 6x16 ft. ventilating fan direct connected to a 22x30-in. Nordberg Corliss engine is housed in a separate fireproof building. The shop, warehouse and office buildings are all of fireproof construction with modern equipment. The mine is operated with Sullivan short-wall chain mining machines and General Electric haulage and gathering locomotives. The construction work of this plant was in charge of D. A. Herbert, who is now general superintendent.

It is suggested that the fireboss, when looking for gas caps, should (1) employ the same lamp every day; (2) that the lamp—if correct percentages are aimed at—should be in exactly the same condition each time the test is made; (3) that the oil and wick and everything in connection with the lamp should be exactly the same at all times. The first condition may be easy to fulfill, but the second and third present some difficulties. The fireboss who gets over them should publish his experience for the benefit of the whole community.



CROSS-SECTION THROUGH TIPPIE

A Portable Self-Rescuer

A portable rescue apparatus for emergency use in mine accidents has been placed on the market recently by the Draeger Oxygen Apparatus Co., of Pittsburgh, Penn. The apparatus weighs only 6½ lb., and can be carried slung over the shoulder or suspended from the neck. The oxygen supply is sufficient to furnish an abundance of air for a period of from 30 to 45 minutes.

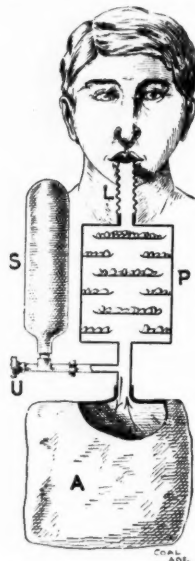


FIG. 1. SECTION OF BREATHING APPARATUS

The accompanying sectional drawing will give some idea of the operation of the apparatus. The oxygen passes from the oxygen cylinder *S* through the closing valve *U* into the breathing bag *A*. The first inhalation draws the air from the breathing bag through the potash cartridge *B*, and the flexible tube *L*. The exhaled air comes back through the tube *L* into the cartridge *B*. Here the nitrogen is freed from the carbon-dioxide, and, passing into the breathing bag *A*, absorbs sufficient oxygen and is again inhaled through the cartridge and the tube into the lungs.

When the oxygen supply becomes depleted, the air can be refreshed by quickly turning the closing valve *N*, admitting a new supply into the breathing bag.

In event of accident, the wearer opens the canvas cover, places the rubber mouth-piece firmly in his mouth, adjusts the nose slits, and then opens and closes the oxygen-cylinder valves. He is immediately supplied with an adequate amount of air.

As seen with breathing bag inflated, it reaches down below the waist line of the wearer and the apparatus appears somewhat cumbersome, but as shown in Fig. 2, which represents a man carrying the apparatus when not in use, it does not occupy much space and could be carried on the back entirely without annoyance. All that is necessary to put it into operation is to unbutton the canvas apron, place the rubber mouth-piece in the mouth, so that the flap sets firmly between the lips and gums. The teeth hold the small rubber lugs in place. The nose clip is next adjusted and the oxygen cylinder opened for a few seconds until the breathing bag is filled. Smoke goggles, if such have been supplied, can then be adjusted over the eyes.

The breathing bag should not be inflated with outside air before turning on the oxygen valve. By letting the inflation of the bag depend entirely on the presence of oxygen, its deflation will be evidence of the absorption of that oxygen as carbon dioxide in the potash cartridge.



FIG. 2. THE SELF RESCUER FOLDED UP AND STRUNG OVER THE NECK

The oxygen valve is opened and closed intermittently, so as to keep the bag supplied with the right quantity of oxygen. Too much should not be used at one time or the pressure will be too high and exhalation will be difficult.

Of course, only fresh cartridges should be used. The potash will rattle when shaken so long as it is fresh. After it has lost its power of absorbing the impurities in the air, it will cease to rattle.

First-Aid Treatment for Fractured or Injured Pelvis

By A. S. SNYDER*

It is always necessary to examine a fractured or severely injured pelvis in order to render first-aid intelligently; and in any case where there is doubt as to fracture, the injured should be treated as if fracture had occurred. It is also important to treat for shock, and some form of stimulant should be administered. When practicable, the patient should be well covered and warmth should be applied to the body.

In securing the injury, place a broad-fold bandage or two, if necessary, around the pelvis; tighten it up until the patient experiences the greatest degree of comfort and then tie it in place. This refers to triangular bandages, as they are generally the only material for that purpose on hand. It is better, however, to have long strips of muslin, from 6 to 8 in. wide, for injuries of this kind, and to secure them by pinning in about four places.

When it is necessary to transfer the injured from the stretcher to the ambulance cot, spread a blanket on the stretcher before placing the patient thereon, so that he may be lifted from the stretcher to the cot without danger of any further injury. In lifting the injured, it is important to keep the blanket well stretched, and, to insure this, three men should be employed on each side. Another man can remove the stretcher and place the ambulance cot beneath the patient, so that he may be lowered perpendicularly on to the cot. The same blanket may be used, in the same manner, in unloading the patient at the hospital.

Careful and gentle handling are all important.

Illinois State Mine Certificates

The State Mining Board of Illinois will hold a meeting at the State House, Springfield, commencing Monday, April 20, for the purpose of examining candidates applying for certificates as Mine Managers (First and Second Class), Mine Examiner, and Hoisting Engineer. Registration of candidates for these examinations will close at 5 p.m., Monday, Apr. 20, at the office of the Mining Board. The State Mining Board is composed of the following men: John Bohlander, president; James Forester, Thomas L. Jones, James Shaw and J. B. McKiernan.

It is possible to inclose all electrical conductors used in coal mines in substantial metallic outer coverings, and Robert Nelson says an appreciable step forward in the direction of greater security will be made when it is fully recognized that all electrical plants intended for use below ground should be so enclosed. This applies to light and to heavy apparatus, that is, to the cables and fittings for electric-lighting apparatus, and to all cables in conjunction with such apparatus.

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Prevention of Coal-Dust Explosions

SYNOPSIS—The British authorities recommend a mixture of stone dust with the powdered coal of the mines, such that, on incineration, the ash left will weigh half as much as the sample taken. This amount will not assure absolute safety, for an explosion which has gained violence in far more favorable mixtures, will extend long distances in roadways strewn with stone dust in the proportion thus suggested.

An experiment conducted by the committee showed that the presence of incombustible dust decreases the inflammability of coal dust. The relative ignition temperature of a coal dust and of the same dust mixed with shale dust so that the mixture contained 20 per cent. of the latter, was 1005 deg. and 1095 deg., respectively. The committee states that the effect of an admixture of an incombustible dust with coal dust on the propagation of inflammation is also marked, and they tabulate the results of experiments in the Altofts gallery as follows:

TABLE SHOWING HOW INCOMBUSTIBLE DUST PREVENTS EXTENSION OF INFLAMMATION

Mixture Parts by Weight		Mixture per Cu. Ft. of Air Space	Result
Coal Dust	Shale Dust	Oz.	
100	0	0.2	Flame propagated throughout the gallery
90	10	0.2	Flame traveled 110 ft. only
90	10	0.4	Flame propagated throughout the gallery
80	20	0.4	Flame traveled 80 ft. only
80	20	0.6	Flame propagated throughout the gallery
70	30	0.6	Flame traveled 63 ft. only
70	30	0.8	Flame propagated throughout the gallery
60	40	0.8	Flame traveled 16.5 ft. only
60	40	1.0	Flame propagated throughout the gallery
50	50	1.0	Evidence of flame in vicinity of cannon only.

The experiments show that the admixture of so small a quantity of incombustible dust as to form 10 per cent. only of the mixture greatly retards the development of an explosion. Thus comparative experiments with (1) pure coal dust and (2) coal dust containing 10 per cent. of shale dust, conditions being otherwise identical, showed:

TABLE SHOWING THAT PROPAGATION AND PRESSURE DEPEND ON PURITY OF DUST

	Mean Rate of Propagation of Flame, in Ft. per Sec.	Maximum Pressure Developed, Lb. per Sq. In.
Pure coal dust	1700	50.0
Coal dust contain- ing 10 per cent. of shale dust	185	4.8

DUST ACTS LIKE AN INERT GAS

The admixture of an incombustible dust with the coal dust, it is explained, appears to act in the same way as the admixture of an inert gas with an explosive gas mixture; the incombustible dust, like the inert gas, takes up heat from the contiguous molecules, and, not being combustible itself, reduces the average temperature. If the temperature is sufficiently reduced the flame cannot be propagated.

The committee emphasize the fact that the "limiting mixture"—half coal dust and half incombustible dust—suggested as unflammable by the above experiments, only holds for the conditions of the experiments, and for

Note—Report of British Explosions in Mines Committee on experiments to determine the influence of incombustible dusts in preventing the inflammation of coal dust.

the means of ignition employed. A more violent means of ignition, such as they have obtained by starting the flame in a mixture of coal dust and air *per se*, may cause propagation of flame even under the adverse condition where inorganic and organic dusts are in equal proportion.

ANTHRACITE DUST WILL EXTEND AN EXPLOSION

It is suggested that in the propagation of flame along a large dust-strewn gallery, the dust from one bituminous coal can be regarded as of nearly equal sensitiveness with the dust from other bituminous coals. The dusts from anthracite coals are, as is well known, of a low degree of inflammability. It is difficult to start the general inflammation of a cloud of anthracite dust; but anthracite dust is quite capable of extending an explosion.

It is not essential to an explosion that coal dust be quite dry; on the contrary, coal with a considerable quantity of moisture in it may form a cloud of dust and be inflamed.

The behavior of coal dust varies with the method of ignition. For example, a large flame of burning gas, unaccompanied by any concussion or violent disturbance of the air, will fail to cause even pure coal dust to propagate flame for more than a limited distance, when the dust is simply deposited in the path of the flame. In order that a self-propagating inflammation of coal dust may be produced by such a flame, it is necessary that the dust should be in suspension in the air as a fairly dense cloud for a considerable distance.

When the flame is accompanied by concussion, as is the case with a blown-out or overcharged shot or an explosion of firedamp, it is no longer necessary for the coal dust to be previously in suspension in the air; but it must be so disposed in the region of the shot that the flame therefrom shall have every chance of igniting a considerable volume of dust-cloud raised by the concussion. In other words, the coal dust must be thick in the air before it can be fired.

EXPLOSION IS NOT CAUSED WHEN COAL AND INCOMBUSTIBLE DUST ARE IN EQUAL PROPORTIONS

A mixture in equal proportions of coal and incombustible dust, lying close to the path of the discharge, did not give rise to a spreading inflammation when a charge of 24 oz. of blasting powder was fired from a cannon in the gallery. It is, therefore, unlikely that such a mixture lying on the floor or other surfaces in a mine would give a spreading inflammation when subjected to the flame of a blown-out shot from a similar charge.

A mixture in these proportions (1:1) is, however, capable of being raised and ignited by a pure coal-dust inflammation (started by means of a cannon shot), and the inflammation, so started, may then be propagated through such mixture.

MUCH MORE INERT DUST NEEDED FOR EXTINCTION

Under the same conditions a mixture containing two parts by weight of incombustible dust to one of coal dust is capable of prolonging the flame of an inflammation started by black blasting powder shot in coal dust, and the flame may continue for a considerable distance

through such mixture before it dies out. Possibly such a mixture might propagate flame indefinitely if the zone of combustion were under still higher pressure. The committee's experiments have only dealt as yet with inflammations in the clear gallery open at one end and without artificial restrictions.

A slowly traveling inflammation, such as is produced when a ready-made dust cloud is ignited by a large jet of gas (unaccompanied by concussion) is at first capable of licking up coal dust deposited upon the surface of an incombustible dust and propagating itself for some distance until sufficient violence is developed to raise the incombustible dust also. This raising of the incombustible dust is more readily effected when a lighter or more buoyant dust, such as flue dust or fuller's earth, is employed, both coal and incombustible dust being raised in suspension together, and the flame soon dying down.

EXPLOSIONS NOT ALWAYS INSTANTLY CHECKED BY INERT DUST

A cloud of ignited coal dust may travel a considerable distance along a clear gallery free from coal or other dust. In many cases also the committee found that an ignition caused by the cannon and tube succeeded by 250 ft. of pure coal dust traveled 500 ft. along a gallery strewn with a 2:1 or even 3:1 mixture of incombustible dust and coal dust—the mixture of incombustible dust and coal being partly blown out of the gallery in front of the flame, and partly burned on mingling with the pure coal dust driven forward from the inflammation zone of pure coal dust.

When the coal dust forming the inflammation zone is previously diluted so as to contain 40 per cent. of incombustible dust, the inflammation is not propagated through a 2:1 mixture strewn in front of it along the gallery, since the mingling of the two mixtures cannot form a combustible cloud for any considerable distance.

Incombustible dust is more effective in preventing the ignition of coal dust than in checking an inflammation that has started. It should, therefore, be distributed uniformly throughout those galleries of the mine subject to the danger of coal-dust ignition, and if maintained in the proportion of between one and two parts by weight of incombustible dust to one of coal dust, the chances of such ignition taking place would be very small. Even a small proportion of incombustible dust (20 or 30 per cent. by weight) has a marked effect in checking an incipient inflammation.

ZONAL TREATMENT NOT EFFECTIVE

The disposal of incombustible dust in zones or in easily disturbed masses concentrated in certain positions, leaving portions of the roads untreated, is, the committee thinks, not likely to be effective. In the case of mild inflammations, an incombustible dust that is readily raised and floats in the air has been found to be more effective than one which, owing to its shape or density, is less buoyant.

Shale dusts, or even heavier dusts, such as sand, are, however, effective when sufficient violence has been attained to raise them in suspension in the air.

As a provisional precaution till their experiments are more advanced, the committee makes the following suggestions: The experiments have clearly shown the great difficulty of initiating an explosion in a gallery where the

coal dust has been mixed with an easily raised incombustible dust so that the mixture contained at least 50 per cent. of incombustible material. Hence, the committee is confident that the dust in a mine so treated would be relatively safe from ordinary ignitions, and consequently that the chance of a disastrous explosion would be greatly diminished.

USE AT LEAST AS MUCH STONE DUST AS THERE IS POWDERED COAL

It is true that such a mixture might not extinguish the fierce flame due to the explosion of a cloud of pure coal dust, or to an explosion of firedamp and air, either of which has gathered violence in its passage along a roadway—these conditions, and the effect of firedamp in the air have still to be tested. But a mixture containing 50 per cent. of incombustible matter may be raised in a cloud and brought into contact with a flame of equal or even greater intensity and volume than those ordinarily met with in a mine, such as might be produced by the ignition of a blower or an accumulation of firedamp, an accidental electric arc, or by a blownout black blasting-powder shot, without inflammation being propagated through it.

Since this admixture with 50 per cent. of incombustible matter, which can be carried out in a simple and practical way, confers on coal dust such power of resisting inflammation, it might be, in the committee's opinion, most usefully adopted now, even if further experiments lead to new developments, or other methods be found more efficient.

APPROVE OF STONE DUST BEING USED INSTEAD OF WATER

They think, therefore, that, as an alternative to watering, the treatment of coal dust by an incombustible dust—so as to maintain an excess of incombustible matter in the mixed dust—might be adopted as fulfilling the requirements of the Coal Mines Act, 1911.

By section 62 (3) and (4) of that act, it is enacted that:

The roof, floor and sides of the roads shall be systematically cleared so as to prevent coal dust from accumulating as far as practicable, and * * * * systematic steps, either by way of watering or otherwise * * * shall be taken to prevent explosions of coal dust occurring or being carried along the roads.

Such a systematic step as is laid down in the above clause would be taken, in the committee's opinion, if the roads were treated with incombustible dust *provided* that the clearing of the roads required above and the treatment with incombustible dust were carried out in such a manner that at no time should such fine dust as was capable of being raised in suspension from the exposed surfaces of the roads contain less than such a quantity of incombustible matter as would make a mixture yielding on incineration at least 50 per cent. of ash.

APPLICATION SHOULD ASSURE THAT THERE IS AS MUCH INERT GAS AS POWDERED COAL ALWAYS AND EVERYWHERE

It should be clearly understood that in recommending this limit of 50 per cent. of ash, they are putting it forward provisionally and as a *minimum*.

The incineration test has been proposed by the committee to test the proportion of shales and other similar

forms of incombustible dusts. But it is not intended to condemn the use of other tests provided they yield trustworthy and equivalent results.

It is not possible to prescribe the quantity of incombustible dust to be applied or the periods of its application, since these will vary according to the conditions of each mine and of different parts of the same mine. But the *proportion* of incombustible to combustible matter in the dust—which is the main factor of security—can easily be tested.

It does not think it practicable to prescribe the methods by which incombustible dust should be applied. The best method would depend upon the circumstances and conditions of each mine; but the incombustible dust should be so applied as to free the timbers and higher ledges as far as practicable from coal dust, and to replace it by incombustible dust.

Inasmuch as in practice the incombustible dust will be applied at intervals, it is obvious that for some time after its application the roadways may contain a proportion of incombustible matter larger than that which the committee recommend as the minimum.

SUGGESTIONS FOR TESTING

For the purpose of examination it is suggested that each sample should be collected not from one spot only, but from the dust deposited generally on the floor, roof and sides over some yards of roadway.

The several samples collected should be well mixed, and a portion sieved through a piece of metallic gauze (such as safety-lamp gauze) with a mesh of 28 to the linear inch; any dust that will not pass through such a sieve should be omitted from the determination.

INCINERATION TEST RECOMMENDED AS SAFE AND SIMPLE, NOT SCIENTIFIC

For the purpose of the incineration test, a weighed quantity of the fine portions so separated should be brought to a red heat in an open vessel until it no longer loses weight. In this process all the natural ash in the coal is reckoned as incombustible dust, and on the other hand any combustible or volatile matter in the incombustible dust is reckoned as coal.

Shales usually contain a small quantity of carbonaceous matter, which is rightly reckoned as coal in the mixture, since it might act as fuel in a mine explosion; but shales always contain also a considerable quantity of incombustible volatile matter, mainly water, which is driven off at a red heat. It will be obvious that this incombustible volatile matter will afford a margin of safety, since in the method of evaluation recommended, such lost matter, although not contributing to make up the 50 per cent. of ash required, will really be effective in the quenching of inflammations in the mine.

For example, in a mixture of equal parts by weight of shale and coal dust used in the committee's experiments, they found on incineration 48 per cent. of ash. The coal contained 3.6 per cent. of ash, so that 50 per cent. of it contained 1.8 parts of ash. The shale lost 7.6 per cent. at a red heat, so that 50 parts lost 3.8 parts, and left 46.2 parts of ash:

	From Coal	From Shale	Total
Ash	1.8	46.2	= 48
Matter lost at red heat.....	48.2	3.8	= 52
Total	50.0	50.0	100

Consequently, this 50 per cent. mixture (equal parts by weight) yielded a total of 48 per cent. of ash, i.e., would have been returned as falling two parts below the proposed minimum requirement, although in reality the mixture contained over 50 per cent. of incombustible matter. The committee have borne in mind this margin of safety in recommending the minimum of 50 per cent. of ash on incineration.

EFFECT OF GAS ON PROBLEM

A considerable difficulty arises with regard to practical application of such a suggestion to the working faces of a mine and to the roads immediately adjoining. This is a matter on which the committee think it desirable that both further experimental data and practical experience should be acquired.

It is possible that the presence of small percentages of firedamp may influence the inflammability of mixtures of coal and of incombustible dusts. But if this is found to be the case it would not affect the suggestion for the treatment of the roadways, since in the main haulage roads, where the coal dust is most dangerous, the amount of gas is usually small.

Experiments upon the effects of watering and other methods of rendering coal dust harmless have yet to be made, and some other matters bearing upon the coal-dust question have yet to be elucidated.

Briquette Production Valued at More Than Million Dollars

Coal briquettes to the amount of 181,859 short tons, valued at the plants at \$1,007,327, were manufactured in 1913, according to Edward W. Parker, of the United States Geological Survey. The figures for 1913 show a decrease of 17 per cent. in the tonnage of briquettes manufactured, but an increase of over 5½ per cent. in value over the figures for 1912. Seventeen briquetting plants were in operation during the year, eight in the Eastern States, five in the Central States, and four on the Pacific Coast. Seven of these plants used anthracite culm or "fines," five used bituminous or semi-bituminous coal, two used carbon residue from oil-gas works, and the others used mixed coals. Coal-tar pitch is the principal binder employed, eight plants using it. Patented binders were used at five plants.

If the future of this infant relative of the coal-mining industry is to be judged by the record of 1913, the judgment should be based on the increase in value rather than on the decrease in plants and in tonnage. Briquetted fuel in the United States is essentially a domestic fuel, for which there was a slackened demand in 1913, owing to the exceptional mildness of the winter of 1912-13, and of last November and December. In consequence the consumption of briquettes for domestic purposes, like that of raw fuel, was generally less throughout the United States in 1913 than in either 1911 or 1912. An exception to this decrease is to be noted on the Pacific coast, where the number of operating plants increased from three to four, and the production in 1913 was exactly double that of 1912, with a gain in value of somewhat larger proportion.

Marketing Conditions, New Orleans

BY PAUL WOOTON*

SYNOPSIS—With the near approach of the opening of the Panama Canal, the coal situation at New Orleans is attracting general interest. Development of an all-water route from the Alabama fields is one of the most important factors so far. Local consumption has tripled in the past decade and even greater increases are anticipated in the future.

New Orleans has to thank the same flood waters, that have menaced so many of Louisiana's fertile acres this year, for the largest supply of coal ever brought to the city. And while the river craft are piling up the reserves of Pittsburgh coal at one end of the harbor, bulging gondolas are being shunted in train lots onto the chutes at the other, where the Alabama supply is overtaxing storage room.

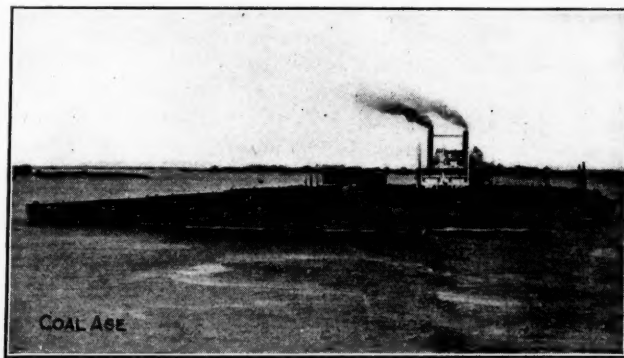
RAPID GROWTH OF THE LOCAL TRADE

That there should ever be a heavy demand for coal at this port was unthought of a few years ago. Big cotton crops, general increases in shipping, the growing importance of the fruit trade and of the passenger travel to Panama, Central America and the West Indies, in addition to the greater number of steam plants ashore, are some of the causes which have more than tripled the coal consumption of this port in less than a decade. In the light of this growth and in view of the opening of the Panama Canal, there is not a coal man in New Orleans who does not take a roseate view of the future.

Alabama interests, feeling that they are handicapped

Rivers will be followed to Mobile, thence across Mobile Bay and Mississippi Sound to Lake Borgne and to the opening of the canal, which has its terminus at Violet, La., on the river eleven miles below New Orleans.

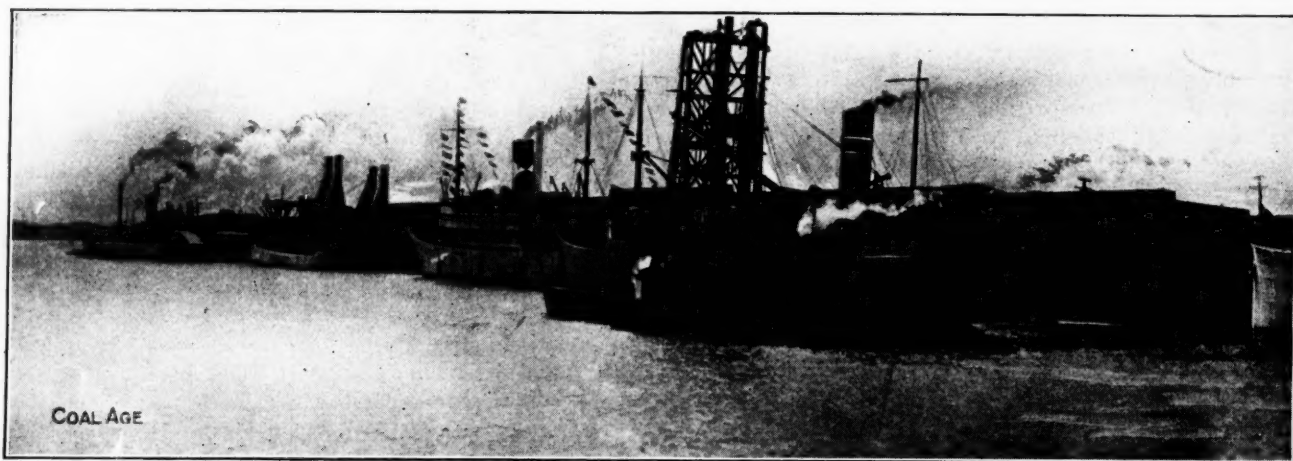
In order to supply the barges for this trade at the least cost it was found necessary to equip a shipyard at



EMPTIES STARTING UP THE MISSISSIPPI FOR PITTSBURGH

Violet. Here the fifteen barges, which will open the trade, have been built. Each barge is 240 ft. long with a 32-ft. beam. They are equipped with twin screws and producer-gas engines; they have a rated speed of eight miles an hour at sea, a carrying capacity of 100 tons and draw six feet of water.

A power lighter with a handling tower of 500 tons per hour capacity has been launched in the river at Violet



COALING OCEAN-GOING VESSELS IN THE HARBOR AT NEW ORLEANS

by the lack of water transportation, are spending \$1,500,000 to make possible the landing of their product independent of the rail lines. In order to get Alabama coal to New Orleans by water it has been necessary to dredge the old Lake Borgne Canal, clean out portions of three rivers, build an extensive loading station and construct specially built barges. Further expenditure has been made in equipping trams for loading the barges in Alabama. The barges will be loaded at stations along the Black Warrior River. The Tombigbee and Alabama

and every facility has been installed to insure rapid and economical handling. The locks, shops and all machinery are operated electrically. A turning basin 300 ft. long has been dredged.

ALABAMA COAL VS. THE PITTSBURGH PRODUCT

As the mines along the Warrior River are developed, the tonnage will be increased. This development will be rapid as the location and continuity of the seams has been proved by diamond drilling. For this reason, the shipyard will continue turning out barges as rapidly as possible. It is predicted that the demand for coal in New

*319 South Cortez St., New Orleans, La.

Orleans will be great enough within the next two or three years to justify the use of hundreds of barges in this trade.

While many claims are made by rival interests, it is the opinion of disinterested students of the situation that Alabama coal can never entirely shut out the Pittsburgh product. On the other hand, it has been proved beyond a doubt that the monopoly once enjoyed by the Pittsburgh dealers can never again be established.

It is practically certain that there will be lower quotations made as soon as Alabama coal begins moving in by the all-water route. This will be met by the other interests without great sacrifice and any probability of a price war is discounted. At present, Pittsburgh coal is trimmed into bunkers on ships at \$3.75 a ton. Alabama coal is furnished at \$3.25. Pittsburgh coal sells ashore at \$3 and the same ratio in price prevails. This represents the general difference in the efficiency of the two kinds of coal.

The retail trade in New Orleans is much lighter than in any other large American city, due to the mild winters. Open grates, for the most part, are used to heat private dwellings and two tons is the amount of coal consumed by the average family during the winter. As

other industries are extensive and with the increasing developments the demand for coal has advanced from a negligible amount ten years ago to interesting figures today.

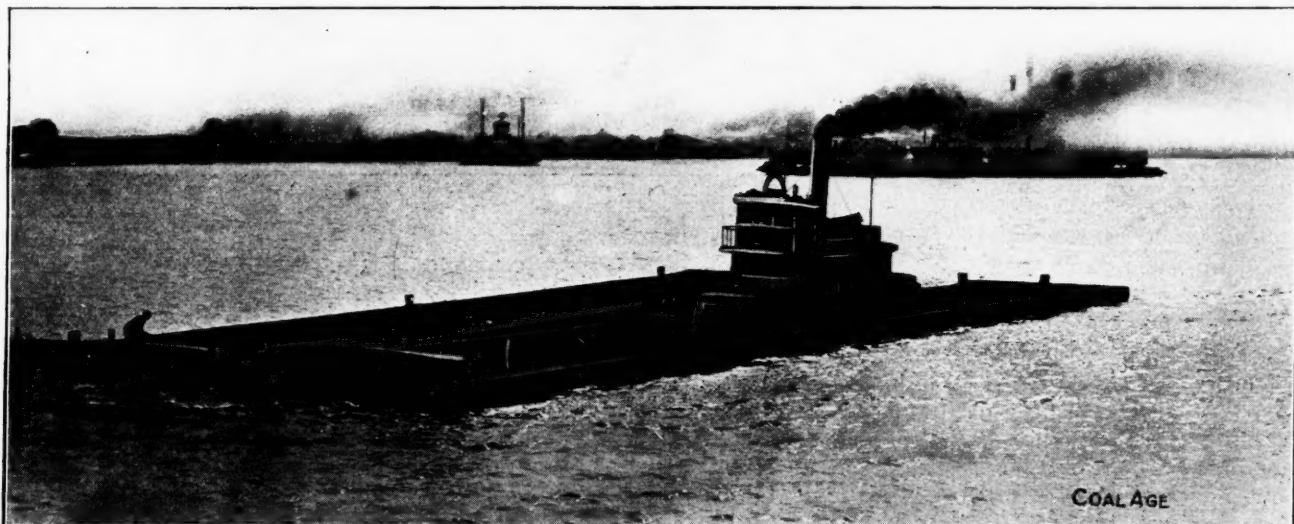
Plans for the increase of facilities in New Orleans are in evidence on the properties of several of the coal companies. Additional room for storage is being provided and heavy expenditures are being made for handling machinery. That New Orleans is to become the greatest coal-exporting port in the country is a view held by many.

■

The First "Strip Pit" Sold

The sale of the first strip-pit or opencut mine to be sold in Kansas by the operators, took place Mar. 20. Also it was the first pit opened in Kansas, and it has been understood that it was the most profitable one.

The pit in question was that of the Miller-Durkee Coal Co., Scammon, Kan. Dan Miller, president of the company and superintendent of the pit, and his son, T. H. Miller, vice-president and assistant superintendent, sold their shares to W. W. Patterson, of Pittsburg, Kan. The latter is a coal operator of 15 years' experience. He will



HANDLING COAL BARGES WITH A TUG IN THE NEW ORLEANS HARBOR

there are so many small orders, the cost of delivery is high, which accounts for the abnormal retail price of \$6 per ton. Liberal discounts are made from this price, however, where the order is large enough to justify it.

Preparations, made by several oil companies for handling fuel oil to ships here, never have been considered seriously by the coal interests. Any undercurrent of nervousness that may have been felt has been dissipated by the rapid rise in fuel-oil prices in the past year.

New Orleans coal dealers are not depending entirely on the growth of shipping at the opening of the Panama Canal to bring the heavy increase in business that they expect. The export trade to Latin America has assumed proportions that show the increasing importance of this field. As New Orleans is closer to the east coast of Central America and to the entire western coast of South America than any other American port, the city expects to be one of the foremost providers for the commercial wants of this vast territory. Mining operations and

superintend the pit. Eighty acres of coal land went with the shovel and pit.

The Millers will rest for a few months and then, it is understood generally, they will become active operators again, probably in the opencut work, as they possess more than 100 acres of fine coal.

Dan Miller introduced the first steam shovel into the Kansas field to strip the covering from coal. He was the sort of pioneer who didn't hesitate because of his discouraging advisors. He was so successful in a short time that other men—Durkee and Pratt—brought in a shovel. Today his pit—the one he sold—is the "daddy" of 35 great pits in Crawford and Cherokee counties. In the four years which Miller has operated the pit, he has uncovered about 55 acres from 15 to 28 ft. deep.

Officers in the new company are: A. H. Skidmore, Columbus, Kan., president; W. W. Patterson, vice-president; and S. L. Walker, Columbus, Kan., secretary-treasurer.

Gasoline Locomotives in a Pennsylvania Mine

SYNOPSIS—A comparative study of the cost of gasoline-locomotive haulage versus mule haulage in proportion to production at the Hagevo operation of the Shade Coal Mining Co.

The Shade Coal Mining Co. has approximately 1000 acres of seam "A," 5-ft. coal and seam "B" Miller vein, 3-ft. 8-in. coal at Hagevo, Somerset County, Penn.

The operation is complete, with up-to-date equipment

inclosed type with two speeds of four and eight miles per hour in each direction. The gears run in oil and are changed by means of jaw clutches with all gears in mesh. The locomotive has sanders on all four wheels, and is provided with an equalized hand brake, operating all the wheels, and a deodorizing tank for absorbing the engine exhaust.

The second locomotive was put in service Mar. 22, 1913, and is a duplicate of the first machine. Before



MOTOR HAULING EMPTY CARS FROM TIPPLE INTO NO. 1 MINE

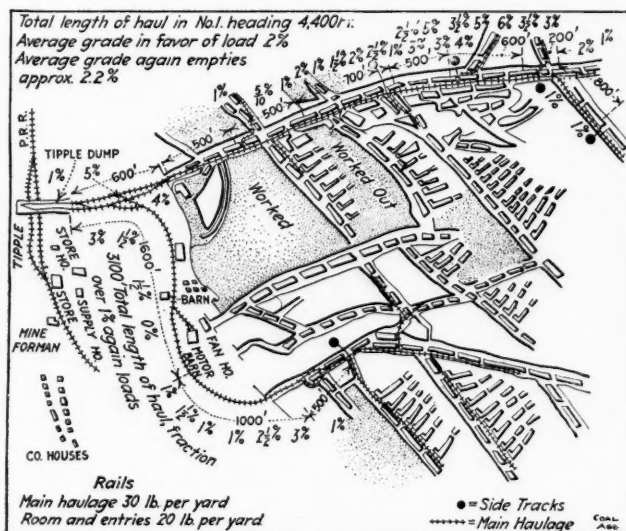


VIEW SHOWING PART OF CAMP WITH COMMISSARY ON RIGHT

throughout. The tippie is 285 ft. long, equipped with a Phillips Mine- and Mill-Supply cross-over dump with kick-back for empties, and has a maximum tippie capacity of 3000 tons daily. A Robinson 300-r.p.m., 65,000-cu.ft. fan has been installed, being driven by a 20-hp. Fairbanks gasoline engine.

The coal is hauled in one hundred and eighty-five 1000-lb. mine cars, having a capacity of 2500 lb., all of these cars being equipped with plain bearings. The outside and main-entry track consists of 30-lb. per yd. rail, and back of the first gathering point in the mine, the rail weighs 20 lb. per yd. The minimum radius of the curves is approximately 30 feet.

The first Milwaukee gasoline locomotive was put in operation, Oct. 12, 1911, and was an M-35, 7-ton, 36-in. gage locomotive. It has a vertical, 4-cylinder, 4-cycle engine, 6-in. bore and 6-in. stroke, which develops 35 hp. at 800 r.p.m. The drive wheels are 21 in. in diameter, wheel base 48 in., length overall 140 in., width overall 49 in., height 49 in. The transmission is of the



HAULAGE LAYOUT AT THE SHADE COAL CO.'S MINE



MINE TIPPLE, ALSO SHOWING LOADED AND EMPTY TRACKS



BEFORE LOCOMOTIVES WERE INSTALLED, MULES WERE USED TO PULL THE TRIPS

the installation of the second motor, in October, 1912, 12,544 tons were handled by the first motor, but in view of the development of the work and tonnage proposed eventually at Mine No. 3, the second locomotive was installed.

Mule haulage was used before the gasoline locomotives were introduced and at that time the following conditions prevailed:

OPERATING CONDITIONS

Length of haul one way, 2640 ft.
Maximum grade in favor of loads, 2½ per cent.
Maximum grade against empties, 5 per cent.
Tonnage per month of 24 working days, 9600 tons.

COST OF MULE HAULAGE

10 mules to handle tonnage @ 60c. per day.....	\$6.00
Above day rate includes feed, harness and shoeing expenses.	
Eight drivers @ \$2.25 per day.....	18.00
Investment in 10 mules @ \$200 is \$2000. Assuming the average life of a mule is 5 years, this gives a 20 per cent. depreciation per year, 24 working days per month, the cost for depreciation per day will be.....	1.38
Interest on investment at 6 per cent. per annum, per day.....	0.41
Mule haulage cost per day.....	\$25.79
Total mule haulage cost per month of 24 working days.....	618.96
Mule haulage cost, per ton.....	0.064
Mule haulage cost per ton mile traveled by loads.....	0.128

GATHERING COST USING MULES AT MINE NO. 1

Tonnage per month of 24 working days, 9000 tons	
3 mules for gathering @ 60c. per day.....	\$1.80
Three drivers @ \$2.50 per day.....	7.50
Mule depreciation.....	0.417
Interest on investment at 6 per cent. per annum, per day.....	0.125
Total gathering expense per day.....	\$9.842
Total gathering expense per month.....	\$236.208
Gathering expense per ton.....	0.0262

MAIN ENTRY GASOLINE HAULAGE AT MINE NO. 1

Length of haul, one way, 4400 ft.	
Maximum grade in favor of loads, 6 per cent.	
Average grade in favor of loads, 2 per cent.	
Maximum grade against empties, 5 per cent.	
Average grade against empties, 2.2 per cent.	
Tonnage per month of 24 working days, 9000 tons	
Motorman for 24 days @ \$2.75.....	\$66.00
Trip rider for 24 days @ \$2.75.....	66.00
Total labor.....	\$132.00
384 gal. of gasoline per month @ 15½c.....	\$59.52
24 gal. engine oil per month @ 30c.....	7.20
6 gal. black oil per month @ 15c.....	0.90
6 lb. cup grease per month @ 15c.....	0.90
Waste per month.....	1.00
Total supplies.....	69.52
Repairs:	
Material.....	\$28.95
Labor.....	6.86
Total repairs.....	35.81
Depreciation on locomotive at 10 per cent. per annum, per mo.....	29.16
Interest on locomotive investment at 6 per cent. per annum, per mo.....	17.50
Total operating cost per month.....	\$283.99
Operating cost per day.....	\$11.83
Operating cost per ton.....	0.0315
Operating cost per ton mile traveled by loads.....	0.0379

GATHERING COST USING MULES AT MINE NO. 3

Tonnage per month of 24 working days, 3500 tons	
1 mule required for gathering at 60c. per day.....	\$0.60
1 driver required per day.....	2.40
Mule depreciation per day.....	0.138
Interest on investment at 6 per cent. per annum, per day.....	0.0416
Total gathering expense per day.....	\$3.1796
Gathering expense per month.....	\$76.308
Gathering expense per ton.....	0.0218

MAIN ENTRY GASOLINE HAULAGE AT MINE NO. 3

Length of haul, one way, 3100 ft.	
Motorman for 24 days at \$3 per day.....	\$72.00
Trip rider for 24 days at \$2.75 per day.....	66.00
Labor.....	\$138.00
120 gal. gasoline per month @ 15½c.....	\$18.60
4 gal. engine oil per month @ 30c.....	1.20
2 gal. black oil per month @ 15c.....	0.30
2 lb. cup grease per month @ 15c.....	0.30
2 lb. waste per month @ 15c.....	0.30
Total supplies.....	20.70
Repairs:	
Material.....	\$28.95
Labor.....	6.86
Total repairs.....	35.81
Depreciation on locomotive @ 10 per cent. per annum, per month.....	29.16
Interest on locomotive investment @ 6 per cent. per annum, per month.....	17.50
Total operating cost per month.....	\$241.17
Operating cost per day.....	\$10.04
Operating cost per ton.....	0.0691
Operating cost per ton mile.....	0.1173

Mine No. 3 is under development, and the motor, as well as the gathering mule and driver, are not working to exceed 40 per cent. of the time. The gasoline consumption, and the amount of sand used, varies with the weather. The gasoline consumption runs from 4 to 7 gal. per day, bad weather causing more wheel slippage and a higher engine speed, and, thereby, increasing gasoline fuel consumption.

SUMMARY BASED ON EXPERIENCE IN MINE NO. 1

Mule haulage cost per ton.....	\$0.064
Gasoline haulage per ton.....	0.0315
Saving per ton.....	0.0325
Mule haulage cost per ton mile.....	0.128
Gasoline haulage per ton mile.....	0.0379
Saving per ton mile.....	0.0901

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Government Control of Lake Traffic

In line with the movement against all business done on a large scale, is the investigation of the management of the ore-carrying fleets on the Great Lakes. No longer does an owner control a single boat. In the process of evolution, the ownerships have consolidated so that one company or firm now manages a dozen, or a score of vessels.

RATES ARE AS LOW AS HALF A MIL PER TON MILE

That the new régime has brought down the cost of lake transportation is considered by these investigators as of small account when set beside the fact that in recent years the contract rates for carrying ore have shown a good deal of uniformity. Those who have followed the statistics of lake freights for years know that 40 years ago a charter from Marquette at \$5 a ton was not uncommon; that 30 years ago \$2 a ton was paid, while 20 years ago the contract rate from Marquette was commonly \$1 a ton.

The inquisitors' report omits entirely any such comparisons as the above, which shows how amazing has been the cheapening of lake transportation. Nowhere else on the globe is there a haul that approaches in cheapness the cost of bringing a ton of iron ore nearly 1000 miles from the docks on Lake Superior to the unloading docks on Lake Erie.

The latter-day rates cited by the committee figure out from 1-15 to 1-20c. per ton per mile, yet the only comment of the investigators is that despite these favorable rates the dividends of the leading lake carriers for five years show that the business was a profitable one!

No violation of the Sherman act is alleged in this concentration of lake-vessel interests; nor is any act detrimental to the public interest. Contrary to intimations lately given from the Department of Commerce that the smaller competitive unit in industry is more efficient than large consolidations, the committee finds great improvements in lake transportation, as strong, well managed companies have become the rule. There is no proposal to separate these companies into their elements, as with the large corporations the government is now prosecuting. The great capacity shown for bettering transportation service on the lakes is held to mean also great capacity to exercise the hurtful powers of monopoly; hence, we come to the inevitable proposal of government regulation. For good or for ill, such a development in lake transportation seems not far ahead.—*The Iron Age*.

A Study of Mine Fatalities

Twenty-seven hundred and eighty-five men were killed in the coal mines of the United States during the year 1913, according to a report just issued by the United States Bureau of Mines. This is an increase of 425 deaths over the previous year 1912, and gives a fatality rate of 3.82 in every 1000 men employed as compared with 3.27 in 1912. Six thousand more men were employed in 1913 and the increase in production was between 30,000,000 and 40,000,000 tons.

Dr. Joseph A. Holmes, director of the bureau, in commenting upon the record for the year said:

An examination of the statistics develops the disappointing fact that in our coal-mining operations during 1913, there were killed 425 more men than during 1912. This is an increase of 18 per cent. in fatal accidents, with an increase of only about 8 per cent. in coal production.

We can find little comfort in the suggestion that this increase may in part be accounted for by the occurrence during 1913 of four large mine explosions. Furthermore, while the total deaths from mine explosions was 213 greater in 1913 than in 1912, the number of explosions in which more than five men were killed was only seven as compared with ten explosions in 1912. In fact, the statistics show an increase in fatalities during 1913 from all the underground causes except mine fires and surface accidents.

Some progress has been made, however, in the safety movement as shown by the statistics for the last eight years. In the four years ending Dec. 31, 1909, the average death rate was 3.97 for each 1000 men employed. In the last four years the rate was 3.68. Comparing deaths with production of coal, the number of fatalities for each one million tons mined during the four years ending Dec. 31, 1909, was 5.99, as compared with 5.11 for the four years ending Dec. 31, 1913. These latter figures indicate a general gain of 17 per cent. for safety during the last four years over the four years preceding. But this progress has been small as compared to that which the country will demand during the next few years.

It is unfortunate that the safety inquiries and investigations by the National Government, upon which so much depends, have lagged so far behind the needs of the industry and public demand. It is hoped that this situation may be remedied at an early date.

The states in which the greatest number of deaths occurred are as follows: Pennsylvania, 1227; West Virginia, 337; New Mexico, 272; Ohio, 165; Illinois, 164; Alabama, 124, and Colorado, 108.

The four biggest explosions of the year and the number of deaths at each were: Apr. 23, Cincinnati mine, Finleyville, Penn., 96; Oct. 22, Stag Canon Mine No. 2, Dawson, N. M., 263; Nov. 18, Acton Mine No. 2, Acton, Ala., 24; Dec. 16, Vulcan Mine, New Castle, Colo., 37

Gravity Railroad Yards

The use of gravity or hump switching for the classification of freight cars, in order to group together those for certain destinations or with certain commodities, is increasing in the case of large and busy yards, and is one of the subjects discussed in the report of the Committee on Yards and Terminals of the American Railway and Engineering Association.

One of the most important elements in the design of a gravity yard is the determination of the rate of grade for the descending or accelerating grades from the summit of the hump, upon which the cars acquire the momentum which carries them along the classification ladder and into the classification tracks. It is difficult to determine this with any degree of exactness since conditions vary in different yards, and factors of location and traffic affect the car movement. In colder districts and where the cars are mainly empty, the grades must be

somewhat steeper than in warmer climates and where the cars are mainly loaded.

The grades must be sufficiently steep to insure that each car will run readily to any part of the classification tracks (under control of the car rider or brakeman), but not steep enough to result in injury to the cars and loading due to the moving cars striking the standing cars with undue force. Some officials consider that there is more damage of this kind in gravity yards than in flat yards, but this is not general experience or opinion, and there is no good reason why it should be the case.

The arrangement of grades previously submitted by the committee and adopted by the Association as "recommended practice" (with the track scale on the grade) is as follows:

1. Where cars are largely empty: 2% for 60 ft. and 4% for 50 ft., followed by 1% on the ladder and 0.5% through the classification tracks.

2. Where cars are largely loaded: the same grades, but the 4% grade may be shortened (to not less than 25 ft.), and the two following grades should be at least 0.8% and 0.4%, respectively.

3. The grade over the scale not to exceed 2%.

The committee made inquiry as to proposed changes in the above, but most of the replies were to the effect that no changes were desired. One reply, however, suggested rates of grades as shown by the accompanying table, the length of incline being 300 ft. in each case, succeeded by 1% grade along ladder and turnouts.

SUGGESTED GRADES AT UPPER END OF YARD			
	Starting	Over Scale	Accelerating
Loaded cars; with scale	3% for 35 ft.	0.5% for 50 ft.	2.5% for 215 ft.
Loaded cars; no scale	3% for 100 ft.		1.5% for 200 ft.
Light cars; with scale	3% for 40 ft.	0.5% for 50 ft.	3% for 210 ft.
Light cars; no scale	3% for 200 ft.		1.5% for 100 ft.

The principal feature of this arrangement is in reducing the grade over the scale, instead of putting the scale on the 2% grade at the summit. The idea is to check the speed slightly in passing over the scale, the steeper grade above the scale being necessary to start and space the cars. This reduction of grade is followed in many gravity yards.—*Engineering News*.

The Champion Mines of Kansas

BY BARRY SCOBEE*

The "champion" coal mine in Kansas, in point of production for 1913, was the Devlin-Miller mine (see Fig. 1) of the Cherokee-Pittsburg Coal & Mining Co. It produced 207,182 tons, according to figures in the office of State Mine Inspector Francis Keegan, in Pittsburg. The mine is seven miles north of Pittsburg in the "north field" of the extreme southeastern Kansas district. Compared to the old "south field," this territory is relatively new.

The southern coal field, which lies mostly in Cherokee County, south of Pittsburg, is practically worked out. This refers to Weir City, Scammon, Chicopee and Mineral, towns well known a few years ago for their big production. However, there still exists in these localities an upper seam of coal, which is being removed by steam shovels in the open-cut process, and which soon will be worked, it is believed, by the longwall method.

*Pittsburg, Kan.



FIG. 1. MINE OF THE CHEROKEE-PITTSBURG COAL AND MINING CO., PITTSBURG, KAN.

Of the four mines in southeastern Kansas which led in production in 1913, and which are here described, only one, "Central 42," is in the south field.

The Devlin-Miller mine is 180 ft. deep, and works a seam averaging 38 to 40 in. in thickness. The coal is mined by the room-and-pillar method, with solid shoot-

The third mine in the series was the Nevius-Coulter (see Fig. 4), at Radley, with 171,641 tons to its credit. It worked 290 days with an average of 175 men. It is about 175 ft. deep.

Mine No. 42 (see Fig. 3) of the Central Coal & Coke Co., three miles southwest of Scammon, was the fourth,



FIG. 2. MINE NO. 15 OF THE WESTERN COAL AND MINING CO., FRANKLIN, KAN.

ing. (This thickness and method are descriptive of practically all mines in the district.) Last year the mine worked 260 days and employed, on an average, 305 men.

The next mine, in point of production, was No. 15 (see Fig. 2) of the Western Coal & Mining Co., which worked 228 days, with an average of 252 men, and took out 174,000 tons of coal. This mine is 200 ft. deep, and is situated near Franklin.

producing 171,339 tons. This shaft is only 60 ft. deep.

In all of these mines the method of firing shots is by lighting the fuse with a torch. A recent report of the state mine inspector showed that 20 shotfirers had been killed in this district in the last three winters, and that deaths usually were due to "windy" shots. Most of these deaths have taken place in the north field, where the mines are deeper and dryer than in the south field.



FIG. 3. MINE NO. 42 OF THE CENTRAL COAL AND COKE CO., SCAMMON, KAN.

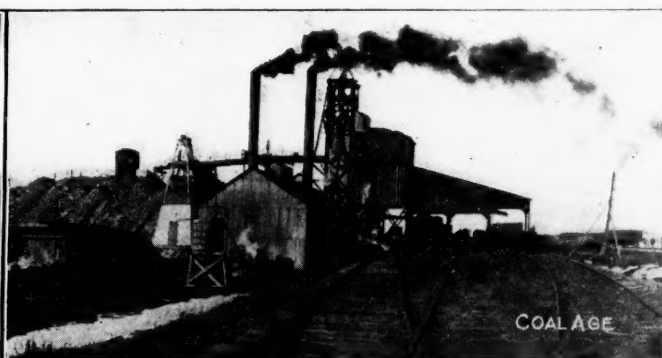


FIG. 4. MINE NO. 8 OF THE NEVIUS-COULTER COAL CO., RADLEY, KAN.

German Coke Ovens

In a paper before the North of England Institute of Mining Engineers, on Feb. 14, 1914, Leo Dorey Ford describes a coke-oven plant he had an opportunity of visiting in Germany. The coke ovens consist of two batteries of 50 ovens each, of the Otto Hilgenstock under-burning regenerative type. The oven chambers are 33 ft. long, 7 ft. high, and have a width of 17½ in. at the pushing-engine side, and of 21½ in. at the discharging side. The charge of an oven is 8 tons of uncompressed small coal, which is hand filled through three charging holes, the coal being brought in 1-ton cars from a central hopper situated between the two batteries.

For the heating of the ovens, the gas from the by-product plant is conveyed through a central main running underneath the entire battery, two small branch pipes being taken off the main directly under the walls of each oven, and connected to nine Bunsen burners which burn in vertical flues in each wall. Each wall is divided into nine separate vertical flues, each of which is divided some distance above the nine burners into two smaller flues. The eighteen main flues are grouped in four sections, the first and the third of which communicate through the second and fourth with a regenerator-flue by way of small openings leading into a horizontal flue running under half of the sole of, say, the left-hand oven. The second and fourth sections communicate in their turn through the first and third sections with another regenerator flue by way of small openings leading into a horizontal flue running under half of the sole of the right-hand oven. These ways form alternately the burnt-gas outlets and the hot-air inlets, according to which set of burners is in use.

The ovens change over every half hour. Taking one wall, for the first half hour, the burners in the first and third sections only are alight, and the burnt gases, after rising to the top of the wall, descend by the dead flues in the second and fourth sections, respectively, passing out through the small openings into the flue under half of the sole of the left-hand oven and so into the dead regenerator flue and up the chimney.

The hot air for ignition comes to the burners of the first and third sections from the live regenerator flue on the other side of the battery by way of the flue under the half of the sole of the right-hand oven with which these sections are in communication.

At the end of half an hour the burners in the first and third sections are extinguished by cutting off the gas and air, which are then admitted to the burners of the second and fourth sections. The burnt gases now, after ascending the flues of these sections, descend the flues of the first and third sections, respectively, and go to the regenerator flue by what was the air-inlet passage for the first half hour. The air for ignition is now admitted from the hot regenerators by what was in the first half hour the burnt-gas outlet.

The two regenerator flues are connected by a common way to the waste-gas chimney and at their junction is a two-way valve, which allows of the closing or opening of either way at will, this automatically opening or closing the other way.

The air burned with the gas is taken from the passages under the ovens, and is regulated by means of sliding shutters placed along the side of the passages.

The gas taps of the small branch pipes, and also the air shutters, are all connected, and are opened or closed together. The changing of the ovens can thus be effected in a few minutes.

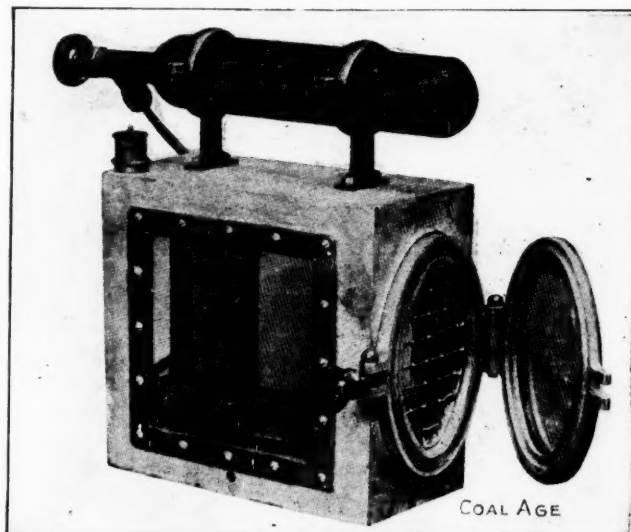
The time taken for coking varies from 28 to 29 hours, each oven giving a 75 per cent. yield, or six tons of good, hard coke. Of the 50 ovens in each battery, 42 are discharged in 24 hours, and give an output of about 500 tons of coke per day.

The yield of gas may be reckoned as 11,300 cu.ft. per ton of dry coke, or some 5,651,000 cu.ft. per 24 hours. Of the total gas, 50 per cent. is burned under the coke ovens, the surplus being divided in the following rough proportion: Illuminating gas, 12 to 20 per cent.; power gas, 12 to 18 per cent.; and gas for heating boilers, 15 to 25 per cent. These figures, of course, vary considerably, according to temporary requirements.

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Cage for Animal Air Tests

Canaries and mice are, as is well known, frequently used in exploration work after an explosion or mine fire to detect the presence of carbon monoxide. Any cage will serve for their transportation either in or outside the mine, but the use of a canary or mouse is entirely lost, if it is once rendered unconscious and if it can only be



CAGE FOR ANIMAL USED IN TESTING FOR CARBON MONOXIDE

revived by taking it for a long time to the surface or to a part of the mine where the air is fresh and brisk.

It is necessary to have a cage which can be rendered air tight and a supply of oxygen which will revive the bird or other animal immediately, presuming it has not been exposed to too deadly an atmosphere. In this way men traveling into places which are dangerously full of noxious gases can retreat and still have an animal in condition to give new indications on a later advance.

The cage is made of metal and has a glass in the back and sides. In front is an oval window with a coarse wire netting and the net is covered when desired by a tight-fitting door. Above the cage is an oxygen cylinder, the contents of which can be gradually discharged into the cage. When the door is closed, a little oxygen admitted to the now air-tight receptacle will soon purify the air

within. Excess pressure is prevented by the escape vent on the top and rear of the receptacle.

The small oxygen cylinder acts as a handle for the cage. As soon as the canary or other animal is overcome it can be revived even if the rescue men have a long way to return in a vitiated atmosphere or find it advisable to go forward, in their helmets, regardless of the indications, leaving the canary behind. This "Animal Air Tester" is made by Siebe, Gorman & Co., of London, England, their agent in America being H. N. Elmer, 1140 Monadnock Block, Chicago, Ill.

Text Book on Safety

An illustrated textbook, principally for the benefit of foreign mine workers who cannot speak English, is being prepared for publication under the auspices of the Young Men's Christian Association workers in the mining districts of West Virginia. The views in the little book will show the mining of bituminous coals at every stage: First, how the work should be done, and second, how it should not be done; the wrong way involving danger and the right way insuring safety.

Some of the pictures that will go to make up this text book have already been shown on the screen at gatherings of foreign mine workers, and they have been explained through interpreters. It is found that this pictorial method is more effectual than any number of printed or spoken warnings.

In recent years, since the English-speaking mine workers began to be supplanted by the immigrants from southern and eastern Europe, the larger companies have undertaken systematic education of their employees. The rules and regulations for safety are emphasized above everything else, and the photographic scheme is simply the latest way to "drive home" these rules and regulations. The official reports of the state inspectors show that most of the accidents are the result of disobedience of rules, either through ignorance or carelessness.

The textbook is so arranged that the pages facing one another will show the way to invite accident and the way to prevent it. The books will soon be ready for distribution by the Y. M. C. A. workers and they will be used generally in educational work throughout the coal region.

Promise and Performance

BY BERTON BRALEY

Written expressly for Coal Age.

"When we get on top," said Mike to Bill,
"I'll spill you around like a pail of swill,
I'll smash your face and I'll bust your jaw
So even your wife or your paw and maw,
Won't know the cripple I'll make of you,
I'll mash you into an Irish stew!
I'd do it NOW, but the Boss is 'round
And he hates this fighting underground,
But I sure will make you take a flop,
When we get on top!"



They mouthed and muttered and cursed and swore,
They threatened each other with death—or more,
They went way back into history
And roasted each other's family,
And they kept right on in their wrath and rage
As they mounted up on the crowded cage,
But when they stepped into broad daylight
And the gang all followed to see the fight
They both looked sheepish and half afraid
And in spite of the gory threats they'd made,
They both hiked homeward without a stop
When they got on top!



"When we get on top," said Bill to Mike,
"You can start right in as soon's you like,
You'll find me ready to meet you there
And I'll certainly smear you around the place
Till there's nothing left but your hide and hair
And maybe a piece of your ugly face!
You've swelled around here long enough
And I'm the guy who will call your bluff!
I'll show you the kind of a gink I am
When I break your ribs with a right-hand slam,
And hammer your mug till you holler, 'Stop!'
When we get on top!"

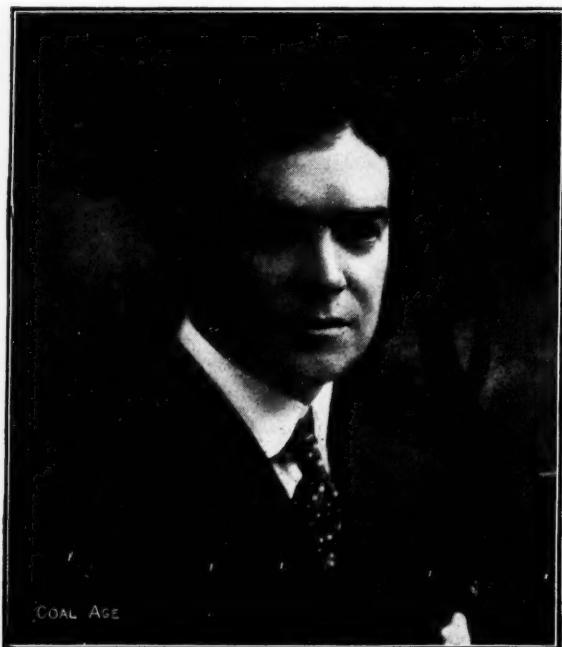


Who's Who in Coal Mining

George R. Wood

George R. Wood, at present electrical and mechanical engineer for the Berwind-White Coal Mining Co., and allied companies, was born at Martin's Ferry, Ohio in 1872. Mr. Wood's ancestors were among the early settlers in Ohio, Absalom Martin, his grandfather, having located on a tract of land granted him by the British Governor Dunmore, of Virginia, for service in the Indian wars. Another, Joel Wood, a Quaker and Abolitionist, prior to the Civil War operated a station on the "Underground Railroad" for runaway slaves.

Mr. Wood received his technical education at the Rose Polytechnic Institute, Terre Haute, Ind., graduating



GEORGE R. WOOD

from that institution with the degree B. S. in Mechanical Engineering, 1892, and B. S. in Civil Engineering, 1893.

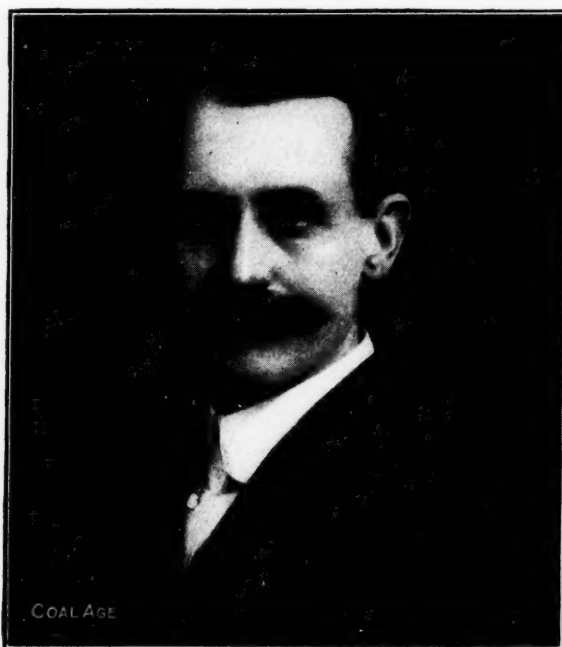
After leaving college he was in the employ of the General Electric Co., leaving them in 1899 to accept a position with the Pittsburgh Coal Co. He remained with this latter corporation until 1902, when he engaged in the practice of consulting electrical engineering, which work he continued until 1912, at which time he became chief electrical and mechanical engineer for the Berwind interests.

Mr. Wood is a member of the Racquet and Manufacturers' Clubs of Philadelphia, University Club of Pittsburgh, American Institute of Electrical Engineers, American Society of Mechanical Engineers, American Institute of Mining Engineers, American Mining Congress, Franklin Institute and Engineering Society of Western Pennsylvania.

Oscar Cartlidge

Oscar Cartlidge, manager of the Illinois State Mine Rescue Station, is a native of Illinois, having been born in that state at Shelbyville, Aug. 12, 1870. His education was received in the common schools of Illinois.

Mr. Cartlidge started life as a miner, soon advancing to the position of mine foreman for the Raymond Coal Co. of Illinois. Later he held a like position with the West Virginia Coal Co., the Johnson City Coal Co. and the Benton Coal Co., all of Illinois. After this, he was foreman for the Kansas and Texas Coal Co. in Arkansas. His next position was as superintendent of the Egyptian Coal Co., of Illinois, after which he again allied him-



OSCAR CARTLIDGE

self with the Johnson City Coal Co., filling the position of assistant superintendent.

Taking up engineering work, Mr. Cartlidge was then appointed mine engineer for the Benton Coal Co., and the Hart-Williams Coal Co., both of Illinois; after this he was made county mine inspector, Franklin County, Illinois, and then state inspector of mines for that state. At the present time, he is manager of the Illinois mine-rescue stations. Under his management, these stations have done a most acceptable work in the actual recovery of mines after fires and in training men for rescue work. It may be added that Mr. Cartlidge has contributed some valuable articles to technical literature.

Oscar Cartlidge is a member of the American Institute of Mining Engineers, American Mine Safety Association, Mine Inspectors' Institute of America and the Illinois Mining Institute.

Editorials

The Lockout

We are not a little disappointed that in face of a national business depression, the operators in central Pennsylvania and Ohio have declared for a lockout. It is true that there is but little demand for coal and that all the fuel which is needed can be secured by the purchase of coal from competing districts. But the suspension of work is hard to describe otherwise than as unfortunate and ill-advised.

In Pennsylvania particularly there was no need for such action. The operators and miners both desired the renewal of the scale with the exception that the miners sought the abolition of car pushing, and a closed shop. Any one acquainted with the conditions realizes that the operators could not grant the former concession demanded without a reduction in the wage scale because the competition of the Pittsburgh district, already severe, would thrust the operators of District No. 2 out of the market. This the miners would have seen sooner or later.

Meanwhile they were willing to continue working during the discussion and what could possibly be gained by a lockout? Clearly the miners stand in a position to gain public sympathy by their much more rational behavior and the operators cannot but place themselves in a laughable position in that they have condemned the Union for preparing for a strike, whereas they were themselves contemplating a lockout.

The Ohio situation is not so simple as that in central Pennsylvania. The new anti-screen law goes into effect May 20. By that time the agreement must be made or the operators must close their mines down, for if they try to establish a run-of-mine scale not suited to the miners, the latter will refuse to work, while if they continue at the old lump-coal scale, they will be subject to a suit with uncertainty as to the outcome should the law be proved of force. They would be liable to have to pay their men at the order of the court a differential which would bankrupt the companies.

This perhaps is the reason why they are anxious to make a settlement without delay. They desire to be idle when coal can be bought without trouble and markets can be kept. No one knows how business may be later in the year.

But let us again urge that the only way to obtain reasonable unions is by being reasonable operators. The only way to get public approval is by abandoning the tactics which the people disapprove, and however crooked the public may be in its own business, it has a book of ethics written for the mine operator far more lengthy, detailed and stringent than Deuteronomy and the Twelve Tables.

We do not blame the "dear public" if they condemn the operators for doing those same things for which the mine owners have condemned the Union. If it is wrong, when a settlement is in sight, for the Union to hold the strike club over the operator even when there is no contract, it is at least equally wrong for the mine owner

to try to drive the miner into line with an actually consummated lockout.

The country needs that as much work shall be supplied to workingmen as possible. This can only be assured by dividing what work is needed over the whole country as evenly as may be. This will give everyone some work and some purchasing power and everyone will be buying something. Times will then not be so bad as if large parts of the country are idle where the workers can buy nothing and other parts are more busy, but the men are hoarding against the possibility of bad times. For it is the purchases of the workingmen which give us prosperity.

Every operator who can, should work. The men will ultimately yield in the districts where there are disputes. We are disposed to believe that the fields made idle by lockouts are likely to lose business in their desire to inflict a loss on their mine workers. This year should be one of victory for the operators, because of the depressed business conditions. Let them not mar their reputation by unreasonableness.

For the miners are likely to model themselves after their employers, and stubborn, suspicious, disaffected men are usually found to be the employees of unreasonable, uncharitable and embittered mine owners.

■

Is the Ohio Screen Law Constitutional?

The Ohio Coal Operators' Association have finally instituted proceedings to test the validity of the new legislation governing mining operations in that state. The initial move is in the form of a suit, filed in the United States District Court, restraining the State of Ohio from putting the new screen-coal law into effect. If possible, it will take the form of an injunction in the name of the Ohio Coal Operators' Association, but in event of such a move not proving legal, the suit will be transferred to some one of the concerns doing business in Ohio, but incorporated and having its principal offices outside of the state.

More than a year ago, the people of Ohio voted upon some articles in the Constitution, in which a certain conservation clause was embodied. It now appears that this was written into the constitution in the form of a "joker" in order to legalize the mine-run law, which followed it later. The advocates of this latter measure, in order to avoid any possibility whatever, of evasion, overstepped the legal prerogatives of a state constitution, and it now develops that the rights of contract have been so abrogated that the law is not constitutional.

That part of the constitution legalizing the conservation measures, also provides that the Supreme Court of the state can only declare an act invalid when six of the seven judges concur in the opinion. The coal operators are, therefore, overcoming this phase of the situation by entering suit in the United States courts—a move

which is to be commended in view of the fact that Hugh McNichols, who was lieutenant governor under Cox, during the time the screen-law was enacted, has since been appointed Chief Justice of the Ohio Supreme Court.

With these proceedings now underway, and negotiations pending for another conference with the Ohio miners, the situation there has materially clarified. A more optimistic feeling prevails generally among the operators, and there is a general belief in all quarters that the present negotiations of the operators will be successfully consummated in time for the local producers to participate in the Lake trade.



Conservation

We are disposed to think that serious attention should be given to the legislation about to be passed on the Western coal lands. And here we pause, because after all is that legislation likely to find place on the statute books at present? Little has been heard of the need of it since Franklin K. Lane declared its necessity, and only George Otis Smith seems to have remembered how essential is a new law to the progress of the West.

Pressure should be brought to bear on the matter will be allowed to drift in favor of less important measures which are backed by more importunate interests and which appeal more forcibly to the imagination of the public.

We wish to draw attention to one form of conservation—that of human effort. What shall be done with land containing coal at a depth of 1000 or 2000 ft. below the surface, which has been approached by the workings of some corporation and left because it is a part of the unprocurable domain of the United States?

The point of approach is secured and the coal has been tested along the property line far better than any drilling could test it. The coal can be delivered to a point on the surface suited for railroad delivery. On the other hand, if the old mine is abandoned, the deeper coal is shut off and must be developed by a deep shaft at much expense. The coal to be exploited must be proved first to be worthy of the expenditure not merely on the border line, but throughout an extensive area because a large sum of money has now to be expended before any return can be anticipated, whereas in the event of the extension of an old mine the extra expense would be negligible.

And possibly in many cases not only is the depth of the shaft a disadvantage, but the location for a tippie and railroad tracks may also be bad.

The worst feature is the fact that the operator must feel assured from the first that the coal is not only of chemical quality suited for profitable merchandizing and of necessary thickness for remunerative mining, but must also know that it is of sufficient strength to make it possible for him to mine it at all. Some of the Western coal is of an extremely friable character.

In some places the coal not only is abandoned at a depth of 1000 to 2000 ft., but dips further to several thousands of feet. Would it not be best to let the companies mining the coal go on down with the seam as far as they can do so profitably and with due conservation?

If, being placed under careful supervision, they extract a large percentage of the coal, it seems that the royalty charge should be small. The coal if left would be

lost for generations and when extracted by a shaft would be as expensive as that produced in Great Britain, Germany and Belgium.

Conservation is saving for future generations, and we must be careful that when we lock up coal wealth for our children, that we do not seal it in a safe so inviolate that the cost of recovery will be greater than the value of the fuel. It would, indeed, be better to give it away for the use of the present consumer than to cache it in a place where no hand could ever reach it.



Straightforwardness

In the last issue of COAL AGE, a contributor discussed, in a frank manner, the straightforwardness that the public have a right to expect of men intrusted with the important duties of mine inspection. Attention was called to the fact that the "court of public opinion" is far more powerful than the law itself to eradicate evil, lessen danger and reduce the accident list. It was claimed that the "hush" policy is wrong in principle, inasmuch as it obstructs the formation of correct public opinion.

We desire, briefly, to indorse these sentiments in their general application to mine-inspection work, with the simple modification that *statements made or information given must concern the parties thus informed.*

The mine inspector is, unquestionably, the servant of the people. He is intrusted with a sacred duty, involving the public health and life. We grant that occasion may not always demand the publication of facts and information in the knowledge of the inspector, and that to avoid unduly exciting public opinion in a matter wholly in control by the inspector, he may, in the absence of immediate danger to others, refrain from giving publicity to some facts in hand. It is a broad principle of equity, however, that *the people have a right to facts concerning their own health and safety, the moment a situation passes beyond the control of the duly authorized officer of law.*

We opine that a mine inspector, in the conscientious performance of his duty and obligation to the people, may withhold any and all information and facts in his knowledge, so long as his silence will assist the ends of justice and does not tend to greater loss and danger to life and property.

There are, on the other hand, just as truly, facts and information in the knowledge of the inspector, that concern only the companies mining the coal, and do not affect public life or property. To divulge such facts and information would be as great a breach of trust on the part of an inspector as to keep silence on matters requiring publicity in order to properly mold public opinion. Truly it may be said, in a broad and general sense, that *the court of public opinion is a court of last appeals, and is incapable of doing an injustice, because it is so constituted that the equal rights of all men, ultimately, find there like recognition.*



Much good would result if coal companies would make compulsory a weekly meeting of superintendents, fire-bosses, mine foremen, master mechanics, stable bosses, hoisting engineers, etc., of each plant for the discussion of working conditions, general operation and all other topics vital to the work in their charge. The plan has been adopted with success by several companies.

Legal Department

Damages for Wrongfully Mining Coal

BY A. L. H. STREET*

SYNOPSIS—Recovery is measurable by value of the coal at the mine mouth, less the cost of production, unless the taking was willful, in which case no allowance is made for expense in mining and removal. Qualifications of the rule noted.

When one mines coal on the land of another and removes it, his liability in damages is limited to the value of the coal in place, on it appearing that he had no title to it, provided he acts in good faith. But, if he acts in willful or reckless disregard of the rights of the true owner, he becomes legally liable for the full value of the coal taken, without deduction for expense incurred in mining and removing the same. And when it is shown that coal has been wrongfully taken from land, the courts will presume that the taking was intentional, in the absence of proof to the contrary. These rules, which were announced by the United States Circuit Court of Appeals for the Eighth Circuit, in the case of *Central Coal & Coke Co. vs. Penny*, 173 Federal Reporter 340, have been substantially followed by all the higher courts of the country. But, although the Illinois Supreme Court recognizes the rule that, in case of an innocent trespass, the aggrieved landowner's damages should be measured by the value of the coal at the mouth of the pit, less the cost of carrying it there, with allowance for mining, that tribunal holds that punitive damages are properly assessed when it is established that the trespass was willful. (*Illinois & St. Louis Railroad & Fuel Co. vs. Ogle*, 92 Illinois Supreme Court Reports 353.)

IMPORTANT COURT DECISIONS CITED

In computing the damages which must be paid for an innocent trespass, the trespasser is not entitled to an allowance for cost of "knocking down" the coal in mining it. (*Alabama Supreme Court, Ivy Coal & Coke Co. vs. Alabama Coal & Coke Co.*, 33 Southern Reporter 547.)

The Iowa statute which makes a coal operator liable in double damages for taking coal from adjoining lands without the owner's permission, creates a double liability for injury done the surface in commission of a trespass. (*Iowa Supreme Court, Mier vs. Phillips Fuel Co.*, 107 Northwestern Reporter 621.)

An operator, in mining coal near the boundary line of an adjoining landowner, is under a legal duty to make surveys to prevent encroachment upon the latter, and to keep accurate accounts of coal mined near the line; and, if he fails to do so, evidence as to the quantity of coal removed from the adjoining land will be construed most strongly against him. (*Tennessee Supreme Court, Coal Creek Mining & Manufacturing Co. vs. Moses*, 15 Lea Reports 300.) In this case it was decided that the measure of damages for an unintended trespass is the value

of the coal in place before the trespass, plus any incidental damage to the land by the taking of the coal or the mode of taking. This same rule was applied by the same court in a case where the trespass was committed under an honest dispute as to title. *Ross vs. Scott*, 15 Lea Reports 479.) Injury to the land, as an element of recoverable damage, was recognized by the Pennsylvania Supreme Court in the case of *Forsyth vs. Wells*, 41 Pennsylvania State Reports 291.

RIGHTS AND LIABILITIES OF THIRD PARTIES

In a Colorado case, in which the land from which the coal was improperly removed was under a mining lease given to a third person, it was decided by the Supreme Court that the lessee properly joined with the landowner in a suit to compel the trespasser to account for the coal taken. (*United Coal Co. vs. Cañon City Coal Co.*, 48 Pacific Reporter 1045.) But in similar circumstances it was held by the Missouri Supreme Court that a lessee who had never attempted to operate under his lease, and who manifested no purpose to do so, was not a necessary party to the suit; the landowner being entitled to recover the full value of the coal wrongfully taken by defendant. (*Lyons vs. Central Coal & Coke Co.*, 144 Southwestern Reporter 503.) And the Kansas Supreme Court has decided that a lessee, who had the exclusive right to conduct mining operations upon a tract of land for a stated period, could not recover more than nominal damages from one who wrongfully removed a part of the underlying coal, where it appeared that the lessee could not have reached the particular coal during the term of his lease. (*Chappel vs. Foster*, 123 Pacific Reporter 870.) In a suit by a landowner for wrongful removal of his coal, it was held by the Missouri Supreme Court to be no valid defense that defendant had settled with a third person, who held a lease on the land, for the value of the coal taken. (*Austin vs. Huntsville Coal & Mfg. Co.*, 72 Missouri Reports 535.) Where one who owned one tract of land and the surface of an adjoining tract purported to lease the right of mining under the latter tract, the Illinois Supreme Court held him responsible for the value of coal taken by the lessee, at the mouth of the pit, less the cost of elevation. (*Donovan vs. Consolidated Coal Co.*, of St. Louis, 58 Northeastern Reporter 290.)

Early Maryland decisions support the rule that if the trespasser, by bad mining or otherwise, leaves the remaining coal in such situation that it cannot be profitably mined, or makes its production more expensive, the landowner can have this injury considered in the assessment of his damages. (*Barton Coal Co. vs. Cox*, 39 Maryland Reports 1, and *Franklin Coal Co. vs. McMillan*, 49 Maryland Reports 549.)

Assumption of Risk of Injury on Ladder—An adult employee being presumed to know every fact which a person of ordinary prudence for his own safety would observe, an engineer at a coal elevator must be deemed to have assumed the risk of being injured through breaking of a defective ladder, if he knew it was worn and old. (*Indiana Appellate Court, Beard vs. Goulding*, 103 Northeastern Reporter 875.)

*Attorney-at-law, St. Paul, Minn.

Lockout in Central Pennsylvania

A large majority of the members of the Association of Bituminous Coal Operators of Central Pennsylvania, District No. 2, representing over 85 per cent. of the total tonnage of the Association, met in Philadelphia, April 11.

The following operators were present:

Allegheny River Mining Co., Buffalo & Susquehanna Coal & Coke Co., Cascade Coal & Coke Co., Cherry Tree Coal Co., Clark Brothers Coal Mining Co., Clearfield Bituminous Coal Corporation, Clearfield Colliery Co., Duncan-Spangler Coal Co., Empire Coal Mining Co., Falls Creek Coal Co., Jefferson Coal Co., Jefferson & Clearfield Coal & Iron Co., Kettle Creek Coal Mining Co., Madeira, Hill & Co., Inc., Martin's Branch Coal Mining Co., Moshannon Coal Mining Co., Northwestern Mining & Exchange Co., Peale, Peacock & Kerr, Inc., Pennsylvania Coal & Coke Corporation, Pioneer Coal Co., Portage Coal Mining Co., Potts Run Land Co., Punxsutawney Coal Mining Co., Rich Hill Coal Co., Rochester & Pittsburgh Coal & Iron Co., Seneca Coal Mining Co., Shawmut Mining Co., Trout Run Coal Mining Co., Watkins Coal Co., and other operators.

The following preamble and resolution was unanimously adopted:

Whereas, the representatives of the United Mine Workers of America and the representatives of the Bituminous Coal Operators Association met in joint conference of their respective scale committees at Du Bois on the 3d of March, 1914, to negotiate a wage scale to cover the period of two years next ensuing after Apr. 1, 1914:

And whereas, the conference, after several days' deliberation, adjourned to meet in Philadelphia on the 23d day of March:

And whereas, the Operator's scale committee offered to renew, for a period of two years, the scale of wages and conditions covered by the scale agreement signed in April, 1912, which is on a higher basis than that paid in competitive districts;

And whereas, after two weeks of continuous negotiation, the representatives of the United Mine Workers of America declined said offer;

And whereas, the representatives of the United Mine Workers of America refused to consider a wage contract that did not carry with it a provision that placed upon the operators the impossible burden of pushing cars, together with closed shop and other conditions which entail a prohibitive expense, the result of which would place the cost of producing coal in the Central District of Pennsylvania beyond the plane of competition;

And whereas, the United Mine Workers of America admitted their inability and refused to make a definite contract until after the policy announced at Chicago by their policy committee had been finally submitted to a referendum vote and ratified;

And whereas, many operators of the Central District of Pennsylvania find that in offering work and in attempting to run their mines at the present time, the majority of the men refuse to work and in fact are on strike;

And whereas, if the operators could succeed in working their mines in whole or in part, they would be working without a contract with the United Mine Workers of America, and consequently upon an unknown wage basis, and, therefore, would be left in the position of not knowing what their coal would cost them f.o.b. cars;

And whereas, the operators, because of the foregoing facts and in the absence of a definite contract with the United Mine Workers of America find themselves in a position where they are unable to promise deliveries, either as to time or amount, and thereby are prevented from entering into the usual annual contracts;

Now, therefore, be it resolved that in view of the foregoing facts and the attitude of the United Mine Workers of America, that we, the operators, today here associated, find it impossible to operate our mines until such time as the United Mine Workers of America, District No. 2, find themselves with authority and willingness to enter into a contract that renews for a further period of two years the wage-scale agreement, which expired Mar. 31, 1914;

Resolved, that the foregoing preambles and resolution be posted at the mines of the operators herein assembled as

notice to their employees that it will be impossible to operate their respective mines after Saturday, Apr. 11, 1914, until an agreement has been reached.

The action taken was not by the association members, but by the individual operators who were in favor of shutting down.

Under the by-laws of the association, it requires a two-thirds vote of the entire membership to order a shut-down. At the meeting of the association where action was taken, there were 46 members present of a total of 60. It required a vote of 40 to pass the resolution for a suspension. It was lost by vote of 39 to 7, just lacking one vote to make the shut-down effective as a resolution of the body as a whole.

The sentiment was almost unanimous that a shut-down should be established, the only difference of opinion being that it was not wise to do so while the miners were powerless to make a scale agreement, full powers being withheld from them, until after the referendum vote of the Policy Committee's report has been taken and counted. This vote was taken on the 14th and will doubtless be counted by the 22d.

Had the vote of the association been taken on the advisability of a shut-down to begin after the 22d, or on May 1, if a new scale agreement were not effective by that date, it seems likely that the vote to suspend would have been adopted practically unanimously.

■

Two West Virginia Mines Have Made New Records

To have operated coal mines ten years or more and in all that time to have but one fatal accident, is a record that few operators can come anywhere near equaling. That is what has been done, however, at two West Virginia mines, according to the state records. One of these mines is that at Logan, W. Va., of which H. S. Gay is general manager, and the other that of the Columbus Iron & Steel Co., at Marting, W. Va., of which W. M. Gilly is superintendent.

The Gay mine has been in operation for a decade and during that time it has produced 805,000 tons. Only one death has occurred, and that was due to carelessness on the part of the man who lost his life.

So far as the records show, the highest tonnage per fatality in this country belongs to the Mine No. 1 of the Columbus Iron & Steel Co., at Marting, W. Va. This mine has been operated for 13 years and in that time it has produced 1,816,583 tons of coal. The records of the Federal Bureau of Mines and of the several state bureaus, do not show any coal mine in the country where the tonnage for each death has been higher. The facts show that if the victim had obeyed the orders of his mine foreman he also would not have been killed.

Both Mr. Gay and Mr. Gilly declare that the good records of their mines are, in no small measure, due to the care with which the miners have obeyed the state laws and the company rules and regulations governing the operations.

Mr. Gay has made a careful study of working conditions for the company at Logan, and he has been one of the leaders of the safety-first movement in that section. Col. J. G. Battelle and J. H. Frantz, president and vice-president of the Columbus Iron & Steel Co., have always insisted upon the principle of safety-first.

Discussion By Readers

Safety or Refuge Chambers in Mines

Letter No. 2—I read with much interest Charlton Dixon's remarks relative to establishing "safety" or "refuge chambers" in mines, with the idea of providing a means of escape from the deadly afterdamp of explosions, by those who have survived the blast, COAL AGE, Mar. 21, p. 498.

I am sorry to say that this suggestion does not appeal to me as altogether practicable, for more reasons than one. In extensive mines, to be available, many such chambers would be required; and as the development of the mine progressed the location of many of these would be inconvenient. In deep mines the expense of boring holes to these several chambers would be considerable. Since no one can foretell the origin or path of an explosion, which may or may not occur, the proper location of such chambers would not be easy to determine. Too often the path of the explosion would cut off the survivors from reaching such places of refuge.

Though much thought and attention have been given to the study of the causes and prevention of mine explosions, and much valuable knowledge has been acquired, explosions still occur, and, at times, we are tempted to think that these dread occurrences are beyond our control and power to prevent. In view of this fact we may ask: Are mine officials, generally, making use of the knowledge thus gained? Knowing that both gas and dust or either are capable of explosion, we ask further: Is every effort being made to remove these dangerous elements from the mines, and adopt such precautions as the use of permissible explosives, clay tamping, the employment of practical shotfirers, the humidifying of the air current with steam from the exhaust of the pump, spraying or sprinkling the roadways, testing the effectiveness of stone dust to prevent the spread of a local explosion and other well known means and methods?

Too often these precautions are disregarded; the mine becomes excessively dry and the dust is allowed to accumulate everywhere. Mines generating gas and, at times, those subject to frequent outbursts of gas continue to operate on open lights or mixed lights. It causes no surprise that explosions continue to occur, when one considers the flagrant disregard of simple necessary precautions that are well known but too often ignored.

We must all acknowledge that many good suggestions are made in respect to greater safety that are not sufficiently tried out in practice. Knowledge without practice is about equivalent to no knowledge at all. It is not so much what we know as what we do that counts for safety; we may know very much and do very little. If mine officials would make a judicious use of the suggestions made and put forth every effort to remove or render harmless elements known to invite explosion, great mine disasters would be less frequent. In dealing with the yellow-fever epidemic in the South, the Government pursued a wise policy in removing the cause by destroying

the mosquito, instead of erecting hospitals and compounding remedies to cure the disease contracted.

Let us, in like manner, make every effort to remove the cause of mine disasters, and the need for safety chambers and other such "after aids" will soon vanish. If the same thought and attention were given to the prevention of disasters, that is now being given to the training of rescue corps and first-aid work, the result would be a more rigid discipline in the mine and a more persistent practice of the known means of safety.

JOHN ROSE,
District Mine Inspector.

Dayton, Tenn.

The Certificate Law

Letter No. 27—Referring to the interesting discussion concerning the mine foreman's certificate, there is one point that, if brought out in previous letters, has escaped my notice. I refer to the ability of the mine foreman to handle men. All the technical education and certificates in the world will not make a man a successful foreman unless he has this essential qualification.

I know an experienced educated man who holds a certificate and, as far as theoretical requirements are concerned, is one of the most competent men in the business; but, as a mine foreman, this man is an absolute failure, because he lacks tact and the ability to get along with his men. It is clear this is a qualification not revealed by the examination, and yet one that must be possessed in full measure by the man who hopes to make a success as a mine foreman.

Other men, again, have no judgment in the hiring of men. The foreman has nothing to guide him in the selection of his men but his knowledge of human nature, which is intuitive, and which some men possess more than others. A group of, perhaps, a dozen men, wait at the top of the shaft for the mine foreman's appearance from below. He has not places for all and must use his best judgment in selecting the most efficient workers and avoiding troublemakers, which are the pests of all mining camps. The mine foreman who lacks this insight into human nature soon fills his mine with a class of men who cause him endless worry and trouble. In the selection of men, the mine foreman should bear in mind the fact that although all men were created free and equal, no two are alike. The foreman must learn to study his men. A frank, open countenance is often a more valuable index of efficiency than a pair of brawny shoulders. Such countenances can be recognized in all races and nationalities.

Again, many a foreman is indifferent to the best interests of the work and will allow personal prejudice, like or dislike, to blind him to the virtues or shortcomings of the men in his charge. Such a foreman will often retain a lazy, inefficient fellow whom he happens to like, and find cause to let a hard-working, industrious man go because he does not like his manner. Men should be judged by

their work, and prejudice should not be allowed to control the judgment of a good foreman.

It must be allowed, however, that in these days of unions, it is not always possible to weed out the inefficient, careless workmen; but when work slackens in the summer a good foreman will not lose the opportunity thus offered to let such men go first. It is my belief that this lack of judgment on the part of the foreman, in the hiring of his men, is more often the cause of failure than any other one thing. Some men, it must be acknowledged, can never acquire the habits that others possess naturally. The question presents itself: Can an examination be devised that will determine whether or not the applicant or candidate for a mine foreman's certificate possesses this supreme qualification?

MINE SUPERINTENDENT.

_____, Wyo.

Fan Ventilation

Referring again to my previous inquiry, COAL AGE, Feb. 7, p. 258, I am still of the opinion that the answer given to Mr. Hopkins' question, COAL AGE, Jan. 24, p. 180, may prove misleading, owing to the fact that Mr. Hopkins does not give sufficient data in stating his question. His proposition is to install a second fan on the left side of the mine, the present fan being located on the right side of the mine but not furnishing sufficient air for the ventilation of the entire mine.

Mr. Hopkins states that both of these fans will blow air into the mine by separate air courses, the one on the right and the other on the left side of the mine, the two air currents uniting at a point about a mile from the mouth of the mine and using the same return airway for this distance. He does not give the distance between the fan now in use and the location of the proposed fan; nor does he state the size of either fan, the quantity of air in circulation, or the water-gage readings.

In my inquiry, Feb. 7, I suggested that we assume that the present circulation, under the conditions described by Mr. Hopkins, in a level seam, is 80,000 cu.ft. of air per min., passing under a water gage of 3.5 in. and produced by a 12-ft. fan. I assumed, further, that the resistance of the return airway is equivalent to a 1.5-in. water gage, and asked how much would the circulation in the mine be increased if a 6-ft. Stine fan was now installed at the back entrance $1\frac{3}{4}$ miles from the present fan, assuming that this second fan was capable of producing 20,000 cu.ft. per min. against a 1-in. water gage.

This is a practical question, as there are 12.5-ft. fans installed at mines in this vicinity, which are producing 78,000 cu.ft. per min. against a 3.8-in. water gage, and 76,000 cu.ft. per min. against a 3.5-in. water gage. I may say that, under the conditions described, I would not consider it practical to install a small disk fan, as suggested.

CONSTANT READER.

Punxsutawney, Penn.

[We quite agree with our correspondent in his conclusions; but must insist, as we stated before, COAL AGE, Feb. 7, p. 258, in answer to this inquiry, that Constant Reader has assumed conditions not involved or suggested in the previous question of Mr. Hopkins.

Mr. Hopkins clearly states that both fans are to operate as blowers, ventilating separate sections of the mine but

using a single return airway for a distance of a mile. Constant Reader wants to install a 6-ft. Stine fan, which is a disk fan, at a "back opening" $1\frac{3}{4}$ miles distant from the first fan. There may be some doubt as to this proposed arrangement; but, from the statement, it would naturally be supposed that the 6-ft. disk fan is to be installed at the return opening, and is to operate as an exhaust fan, the distance between the two fans being $1\frac{3}{4}$ miles. It is not clear, however, what is meant here by the "return airway." It is impossible to state how much, if any, the circulation in the mine would be increased by the installation of this fan.

In this connection, we would draw attention to a similar question, COAL AGE, Mar. 28, p. 539, which suggests installing a 6-ft. disk fan to ventilate a portion of a mine requiring more air. The present circulation, in this mine, is 78,000 cu.ft. per min., passing under a 3.4-in. water gage. This question clearly states that both fans will use the same return airway for a distance of 1 mile, but does not speak of a "back opening."

In answer to this last question (p. 539), we have assumed that both fans are operated as blowers. These fans, as in Mr. Hopkins' case, are thus assumed to work in parallel on two separate sections of the mine, using a common return air course; but, as stated in answer to each of these questions, it will be necessary to regulate or balance the two circulations. On the other hand, we understand the proposition of Constant Reader to refer to a tandem system of ventilation, the one fan blowing and the other exhausting, which has reference to the second fan acting as a "booster." The success of such a system will depend on two principal conditions, as previously stated (p. 259), namely, a possible shortening of the distance of air travel; and a possible condition of dead air in a portion of the workings, owing to leaky stoppings or dispersion of the air current in the mine and possible escape through other openings.—ED.]

The Mine Foreman

I was greatly interested in the article by Mr. Srodes, entitled "A Plea for the Mine Foreman," COAL AGE, Mar. 14, p. 458, inasmuch as I have long viewed the subject from the same point of compass as Mr. Srodes and can endorse all that he has said.

I feel sure that there is not a competent mine foreman in the state of West Virginia who does not feel the need of protection from some source. The state mining law gives him no protection but makes him responsible for the safe operation of the mine, requiring many things of him in his official capacity that he has no power to perform.

As far as the operation of the mine is concerned, that, in almost every case, is in the hands of the superintendent or manager, who, though he regards the mine foreman as a mere timekeeper, blames him for any mishap or accident that may occur in and around the mine.

Although the mine foreman is not permitted to choose, much less to dictate the manner in which the work should be done, and the means and methods employed are not such as he would adopt, he is held accountable for any undue increase in the cost of operation. The expense sheet may grow under the protest of the foreman, who desires certain changes in order to reduce the cost of operation which, however, the superintendent in charge

does not regard favorably, because of the necessary outlay required to make such changes.

The superintendent is often too far removed from the actual work underground to fully realize and appreciate the need of what the mine foreman recommends. Under these conditions, it is easy to see that there is too often a lack of coöperation between the office and the underground work. As a result, not infrequently, the office decides that it is necessary to change the mine foreman; and the latter is notified, as I have known to be the case, Saturday night that there would be another man to take his place Monday morning. No one will say that this is good business or right. It is, nevertheless, one of the hardships the mine foreman must endure.

Because the mine foreman is the man in direct charge and responsible for the performance of the work, the law, in many states, requires that he must pass a rigid examination to prove his competency to assume that position. The superintendent is not required to pass such an examination, but is the one who practically controls and directs the work. The mine foreman must spend much time and money to prepare himself for examination. He must continue to spend time and money for books and mining papers that will enable him to keep in touch with the best means and methods of mining. Notwithstanding this, as Mr. Srodes has stated, the

pay of the mine foreman is inadequate to enable him to maintain the standard required.

The mine foreman must have practical experience. The most successful foremen are those who have worked their way from trapper boy up to that position, stimulated by the ambition to become foreman of the mine. When, at last, he realizes this hope, he finds that his authority and usefulness are limited while his responsibilities have increased. Before, he regarded only his own safety, now he is held responsible for the safety of every man in the mine, besides being blamed for any financial loss arising from the carrying out of plans made in the office, and which prove ill suited to conditions existing in the mine.

The foregoing are facts with which every mine foreman is well acquainted. The question is: "What can be done to lighten the burdens of the mine foreman? Is it not a case similar to that of "taxation without representation?" He is expected to carry out plans that his practical judgment pronounces difficult or wholly impossible without loss, for which he will be blamed. Let this question be carefully considered and discussed, in the hope that suggestions may be made that will be practical and helpful.

MINE FOREMAN.

—, W. Va.

Study Course in Coal Mining

By J. T. BEARD

The Coal Age Pocket Book

PROPORTIONATE DIVISION OF AIR

Every large and well managed mine is, now, divided into two or more separate ventilation districts. The natural division of the air current between these several districts is not generally in proportion to their respective needs.

The longer entries, working more men and requiring the most air for their ventilation are the ones that have the greater resisting power, and, as a result, receive a lesser proportion of the air, in natural division; while, on the other hand, the shorter air courses where fewer men are working and less air is required, have a smaller resisting power and naturally pass the larger quantity of air.

To Regulate the Air.—In order to overcome these natural conditions, in mine ventilation, and divide the main air current so as to give each district of the mine the required proportion of air, it is necessary to employ some means that will produce this result.

Two methods have been used to divide the air proportionately; they are as follows:

1. The flow of air is obstructed in those airways that take naturally more than the desired proportion.

2. The power on the air, at the mouth of each split, is proportioned to the work to be performed in that split.

The former of these two methods has been in common use for many years; the latter was suggested (Mine Ventilation, Beard, 1894, p. 93) as an improvement and has been put in use since in many mines.

The Box Regulator.—This form of regulator is shown in Fig. 1, and consists of a brattice built in the return airway or haulway. As shown in the figure, an opening is provided in the brattice and a sliding shutter is used to regulate the size of the opening so as to control the flow of air in that airway or split. If more air is needed the shutter is pushed back so as to enlarge the opening; or the shutter can be partially closed to decrease the quantity of air passing in the split.

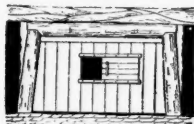


FIG. 1. THE BOX REGULATOR

The Door Regulator.—Wherever the conditions will permit this form of regulator to be employed it will be found an improvement over the common "box regulator," just described.

As shown in Fig. 2, the door regulator consists of a door hung at the mouth of an entry or split and swung into the wind. The door should be arranged so that it will fall naturally against a set-stop, and when not in use will assume a position whereby the air current will be divided in the desired proportion, between the two airways or splits.

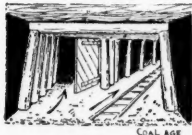


FIG. 2. THE DOOR REGULATOR

The Coal Age Pocket Book

Effect of Regulator.—Any regulation of the air current in a mine, to accomplish a distribution of air other than what is natural, causes an increase of both the power producing the circulation and the resulting pressure or water gage. This is true in every case, whatever form of regulator is employed, provided the total quantity of air in circulation is not decreased. The reason that an increase of power is necessary in proportionate splitting, is that an increase in the circulation in any split causes a corresponding increase in pressure; and this pressure is the same for all splits starting from the same point in the mine. To circulate the same quantity of air against this higher pressure requires a corresponding increase of power.

Illustration.—Let it be required to find the horsepower and the pressure per square foot, in the following distribution of the air current between the given four splits; the natural distribution of air, as previously calculated, being also given for sake of comparison:

		Nat. Div. (cu. ft. p. m.)	Reqd. Div. (cu. ft. p. m.)
Split A,	8 × 12 ft., 6000 ft. long,	23,710	20,000
Split B,	6 × 20 ft., 12,000 ft. long,	16,450	40,000
Split C,	6 × 12 ft., 8000 ft. long,	18,750	30,000
Split D,	4 × 6 ft., 1000 ft. long,	41,090	10,000
Total circulation,		100,000	100,000

Solution.—The first step is to calculate the natural pressure for each split when passing the required quantity of air per minute, by substituting the following values for the area, perimeter and length of each split, in the formula for unit pressure:

Split A,	$a = 96 \text{ sq. ft.};$	$o = 40 \text{ ft.};$	$l = 6,000$
Split B,	$a = 120 \text{ sq. ft.};$	$o = 52 \text{ ft.};$	$l = 12,000$
Split C,	$a = 72 \text{ sq. ft.};$	$o = 36 \text{ ft.};$	$l = 8,000$
Split D,	$a = 24 \text{ sq. ft.};$	$o = 20 \text{ ft.};$	$l = 1,000$

The natural pressure for each split is then,

$$\begin{aligned} \text{Split A, } p &= \frac{0.00000002 \times 6000 \times 40 \times 20,000^2}{96 \times 96 \times 96} = 2.17 \text{ lb. per sq. ft.} \\ \text{Split B, } p &= \frac{0.00000002 \times 12,000 \times 52 \times 40,000^2}{120 \times 120 \times 120} = 11.55 \text{ lb. per sq. ft.} \\ \text{Split C, } p &= \frac{0.00000002 \times 8000 \times 36 \times 30,000^2}{72 \times 72 \times 72} = 13.89 \text{ lb. per sq. ft.} \\ \text{Split D, } p &= \frac{0.00000002 \times 1000 \times 20 \times 10,000^2}{24 \times 24 \times 24} = 2.98 \text{ lb. per sq. ft.} \end{aligned}$$

The highest natural pressure is developed in Split C, by the required distribution of air, and this is, therefore, the "open" or "free" split, regulators being necessary in each of the other splits, to raise the pressure to that amount.

The horsepower producing this circulation is then,

$$H = \frac{100,000 \times 13.89}{33,000} = 42.09 \text{ hp.}$$

Inquiries of General Interest

Study Questions--Ventilation

A question that has given us considerable trouble and aroused much interest and discussion is the following:

What must be the area of an airway that will pass 10,000 cu.ft. of air per minute, under a water gage of 1.7 in., the length of the airway being 5000 ft.?

X.

Pittsburgh, Penn.

The only way this question can be worked is to assume that the airway is circular, or square, or has a known ratio of height to the width of airway. The formula for water gage, in terms of the quantity of air in circulation in an airway, is

$$w.g. = \frac{k l o q^2}{5.2 a^3}$$

But the perimeter o and the area a of a circular airway may be written in terms of the diameter of the circle; thus,

$$\frac{o}{a^3} = \frac{\pi d}{(\pi/4 d^2)^3} = \frac{64}{\pi^2 d^5} = \frac{6.484}{d^5}$$

Substituting this value in the previous formula for water gage, and solving with respect to the diameter d ,

$$d = 0.03 \sqrt[5]{\frac{l q^2}{w.g.}} = 0.03 \sqrt[5]{\frac{5000 \times 10,000^2}{1.7}} = 5.9 \text{ ft.}$$

The sectional area corresponding to this diameter is

$$a = 0.7854 \times 5.9^2 = 27.34 \text{ sq.ft.}$$

In a similar manner, for a square airway,

$$\frac{o}{a^3} = \frac{4d}{(d^2)^3} = \frac{4d}{d^6} = \frac{4}{d^5}$$

Then substituting this value in the formula for water gage, and solving again with respect to d ,

$$d = 0.0274 \sqrt[5]{\frac{5000 \times 10,000^2}{1.7}} = 5.4 \text{ ft., nearly}$$

This being the length of one side of a square airway, the area is

$$a = d^2 = 5.4^2 = 29.16 \text{ sq.ft.}$$

For a rectangular airway, in which the ratio of the height to the width of the airway is r ,

$$\frac{o}{a^3} = \frac{2d(1+r)}{(rd^2)^3} = \frac{2(1+r)}{r^3 d^5}$$

Then substituting this value in the formula for water gage and solving with respect to d , gives, for the width of the airway,

$$d = 0.0238 \sqrt[5]{\frac{l q^2}{w.g.} \frac{1+r}{r^3}}$$

For example, assuming that the ratio of the height of the entry to its width is 0.6, the width of entry required to pass 10,000 cu.ft. of air against a 1.7-in. water gage is

$$d = 0.0238 \sqrt[5]{\frac{5000 \times 10,000^2}{1.7} \left(\frac{1+0.6}{0.6^3} \right)} = 7.0 \text{ ft.}$$

The height of this airway is, then, $0.6 \times 7 = 4.2$ ft. The area of the airway is

$$a = r d^2 = 0.6 \times 7^2 = 29.4 \text{ sq.ft.}$$

Y.

Cubic Capacity of Anthracite Sizes

Kindly advise me, through the columns of COAL AGE, how many cubic feet per ton there are in the following sizes of anthracite: Egg, stove, chestnut and pea.

H. G. M.

Seneca Falls, N. Y.

The cubic capacity of coal varies with its specific gravity; and, for all accurate determinations in this regard, it is important to ascertain the average specific gravity of the coal in question. For purposes of estimate, however, it may be stated that the specific gravity of anthracite may vary from 1.3 to 1.75, depending on the quality and hardness of the coal and the impurities contained therein. The specific gravity of bituminous coal varies from 1.25 to 1.40, depending on the same characteristics. The average specific gravity of anthracite may be taken as 1.45; and of bituminous coal, 1.3.

Except in special cases, where great accuracy is required, the cubic capacity of the sizes known as egg, stove and chestnut varies so slightly that the difference can be safely ignored, it seldom amounting to over 1 per cent. The difference in cubic capacity per unit weight of sized coal varies mostly with the treatment. In some cases, the sizes, stove and chestnut weigh heavier per cubic foot than the larger egg coal; but, in general, the larger sizes of coal weigh slightly in excess of the smaller sizes, per unit volume. In almost every case, pea coal weighs less per unit volume than the larger sizes. This is due, in part, to the fact that coal is more friable than its impurities and crushes to a finer state. For this reason, the larger sizes naturally contain a greater percentage of impurities than the smaller sizes. However, the market specifications for anthracite are such as to demand special treatment to eliminate these impurities, with the result that the larger sizes of anthracite screenings thus treated, generally, contain less impurities and weigh lighter than the smaller sizes of pea, buckwheat, etc., which are not subject to the same rigid specifications.

As far as cubic capacity is concerned, however, as previously stated, the differences due to size, of screenings may be ignored, as this seldom exceeds 1 or 2 per cent. The general practice in the anthracite region of Pennsylvania, in the sale of coal, is based on the long ton (2240 lb.); while the sale of bituminous coal is always based on the short ton (2000 lb.). A common rule, in practice, based on this fact, is the following:

RULE—A long ton of anthracite or a short ton of bituminous coal broken to market sizes occupies 40 cu.ft. of space.

This rule will be found to give practical results.

Examination Questions

Miscellaneous Questions

(Answered by Request)

Ques.—An air current of 140,000 cu.ft. per min. divides at the shaft bottom into three splits, as follows:

Split A, 6x9 ft., 9000 ft. long;

Split B, 6x9 ft., 12,000 ft. long;

Split C, 6x8 ft., 6000 ft. long.

Find the natural division of this current of air.

Ans.—Since the unit pressure is the same for all splits starting at the same point in the mine, the first step is to calculate the pressure potential for each split, by substituting the lowest relative values for the several areas, perimeters and lengths of the airways, in the formula

$$X_p = a \sqrt{\frac{a}{lo}}$$

The areas (*a*), perimeters (*o*) and lengths (*l*) of the several splits are as follows:

Split A, *a* = 54 sq.ft.; *o* = 30 ft.; *l* = 9000 ft.

Split B, *a* = 54 sq.ft.; *o* = 30 ft.; *l* = 12,000 ft.

Split C, *a* = 48 sq.ft.; *o* = 28 ft.; *l* = 6500 ft.

Reducing these to the lowest relative values, by canceling the common factors in the areas, perimeters and lengths, gives the following:

Split A, *a* = 9; *o* = 15; *l* = 18

Split B, *a* = 9; *o* = 15; *l* = 24

Split C, *a* = 8; *o* = 14; *l* = 13

The relative split potentials are then found as follows:

$$X_a = 9 \sqrt{\frac{9}{18 \times 15}} = 9 \sqrt{\frac{1}{30}} = 9 \sqrt{0.0333} = 1.6432$$

$$X_b = 9 \sqrt{\frac{9}{24 \times 15}} = 9 \sqrt{\frac{1}{40}} = 9 \sqrt{0.0250} = 1.4230$$

$$X_c = 8 \sqrt{\frac{8}{13 \times 14}} = 16 \sqrt{\frac{1}{91}} = 16 \sqrt{0.0110} = 1.6773$$

Sum of relative potentials 4.7435

In splitting, the ratio of the quantity of air passing in each split to the total quantity of air in circulation is equal to the ratio of the corresponding split potential to the sum of all the potentials. This rule gives for the quantity of air passing in each split as follows:

$$q_a = \frac{1.6432}{4.7435} \times 140,000 = 48,500 \text{ cu.ft. per min.}$$

$$q_b = \frac{1.4230}{4.7435} \times 140,000 = 42,000 \text{ cu.ft. per min.}$$

$$q_c = \frac{1.6773}{4.7435} \times 140,000 = 49,500 \text{ cu.ft. per min.}$$

Total 140,000 cu.ft. per min.

Ques.—What dangers may arise from the use of electricity in mines? Give your recommendations for avoiding these dangers.

Ans.—Briefly stated, the dangers arising from the use of electricity in mines are as follows: 1. The liability

of contact of men or animals with live wires, with the possibility of fatal results. 2. The liability of ignition of gas or other combustible material by sparking of the contacts or the short-circuiting of the current.

When proper care is taken in the installation and due precautions are observed and strict regulations enforced, these dangers are minimized. All medium-voltage or high-voltage conductors should be properly insulated and should not be installed on haulage roads and manways. All conductors and trolley wires should be properly safeguarded at partings or crossings where men or animals are liable to contact therewith. All installations of electric wires and other apparatus should be made by a competent electrician. Fuses, switchboards and other dangerous parts should be protected, and inspected regularly.

Ques.—A pressure of 1.5 in. of water gage gives, in an open airway, 24,000 cu.ft. of air per min. It is desired to reduce this quantity of air in circulation, to 6000 cu.ft. per min., by introducing a regulator in the airway. (a) What will be the required pressure, after the regulator is in place? (b) Assuming the velocity in the open airway was 600 ft. per min., find the velocity of the air current after the regulator is introduced.

Ans.—(a) The question does not state whether the power or the pressure remains constant. Assuming a constant power on the air, the unit pressure (*p*) will vary inversely as the quantity of air in circulation. In other words, the pressure ratio is equal to the inverse quantity ratio. The unit pressure corresponding to a 1.5-in. water gage is $1.5 \times 5.2 = 7.8$ lb. per sq.ft.; and, calling the required pressure *x*,

$$\frac{p_2}{p_1} = \frac{q_1}{q_2}; \text{ and } \frac{x}{7.8} = \frac{24,000}{6000} = 4$$

$$x = 7.8 \times 4 = 31.2 \text{ lb. per sq.ft.}$$

(b) For the same sectional area of airway, the velocity of the air current will vary as the quantity of air in circulation. The quantity of air being reduced one-fourth, the velocity is reduced in the same ratio, and is, therefore, $600 \div 4 = 150$ ft. per min.

The above solution assumes that the power on the air remains constant and the quantity is reduced to one-fourth the original quantity, by means of a regulator. In such case, when the regulator is put in place, the power on the air remaining unchanged, the pressure will be increased four times, giving a $4 \times 1.5 = 6$ -in. w.g.

On the other hand, if the question means to ask for the pressure due to the regulator, for a constant pressure on the air, it is necessary to calculate, first, the natural pressure due to friction when the quantity is reduced one-fourth. In such case, the pressure varies directly as the square of the quantity; or the pressure ratio is equal to the square of the quantity ratio. The quantity ratio being $\frac{1}{4}$, the pressure ratio will be $(\frac{1}{4})^2 = \frac{1}{16}$. The natural pressure due to friction is, therefore, $1.5 \times \frac{1}{16} = 0.09 \frac{1}{2}$ in. Subtracting this natural pressure from the original pressure gives, for the pressure due to the regulator, $1.5 - 0.09 = 1.41$ in.

Coal and Coke News

Washington D. C.

The Federal Industrial Commission is devoting considerable attention to the question of whether the present situation in coal mining is satisfactory or not and the methods that should be employed if the government determines to interfere in any way between operators and employees. Several hearings have been had during the past week with respect to this question, among the witnesses being John Mitchell, who has revived the suggestion frequently made during the past year or two that there be a commission or counsel of some kind established by the government for the purpose of fixing prices and regulating wages or overseeing both.

This step Mr. Mitchell thought was desirable also from the conservation standpoint, because at present much coal was wasted in the United States, owing to the inability of operators to dispose of it at a profit. The amount which thus went to waste he thought might run as high as 40 per cent. of the total output.

The necessity or at all events desirability of miners' wages being overseen by the government was indicated, Mr. Mitchell thought, by the improved conditions since 1897, there having been much arbitration and conciliation in the industry since that time.

Mr. Mitchell thought the miner was entitled to as good pay as any industrial worker in the country and urged that he should be definitely recognized through some kind of government conciliation process. The commission has evidently been disposed to give careful attention to this phase of the argument and other witnesses have been summoned who will testify along the same general lines. It is understood that the reports of the commission will contain a good deal of discussion of the general question of arbitration and conciliation and that recommendations will be made on that topic.

The attempt is now being made to secure in the pending anti-trust legislation which the administration plans to support some provision that will call for special attention on the part of the trade commission which is expected to be named, to questions of mining and to mine operators' agreements of various kinds. If this could be done, it is thought, there might be less demand for the creation of a special industrial counsel to look after miners' disputes as recommended by Mr. Mitchell and others.

A Decision Is Early Expected

The Interstate Commerce Commission, it is now practically certain, will at an early date announce a decision in the advance rate cases which have been pending before it for some months past. The prevalent expectation is that this decision will provide for some increases in rates, although probably not for advances on the heavier and bulkier commodities which are believed to be bearing at the present time about all of the burden that is properly to be attributed to them.

Among the items on which no advances are expected are coal, cement and other goods in the same general classification. As is well known, Louis D. Brandeis, who has been acting as counsel for the commission, was counsel for the bituminous operators in the Bolleau case some two or three years ago, and at that time became firmly convinced that with coal prices at their present figure the producers could not afford to pay a heavier rate for transportation than they are now expected to stand, particularly in the Middle-western region.

During the hearings before the Interstate Commerce Commission the bituminous men have made strong pleas against being subjected to any advance in rates on the ground that they could not keep in business if they were to have to pay more for shipping their coal to lake ports particularly, and probably not if they were required to pay heavier freight rates on coal going to other points.

This decision, while pleasing to coal men, will be much less satisfactory to others, because of the fact that it will necessarily involve the placing of such advances as may be granted entirely upon the other commodities so that the more relief there is for shippers of coal and other bulky

commodities the more severe will be the rate advances that must be allowed if there is to be any real concession to the roads on the freight that is less bulky and bears a higher classification.

It is, however, believed that the action of the commission may involve some important announcement concerning the question of cars and practices on the part of shippers who are now receiving special services from the roads free or nearly so.

HARRISBURG, PENN.

The coal situation in the central Pennsylvania, or Clearfield district, where work was suspended on Apr. 11, by order of the operators who control about 85 per cent. of the tonnage output, has been resolved into speculation as to what will be the outcome of the vote to be taken by the miners of the district, and which will be determined by about Apr. 22. By this action the operators have put the matter of settlement squarely up to the men.

The greatest concern has been felt over a possible shortage of coal, but there seems little possibility of such a contingency until the expiration of about six weeks to two months. The operators, foreseeing the present status of affairs, have been shipping heavily from the mines for some time, and they state that there is abundant coal in hand to meet all demands for the time named. In the meantime, hope is expressed on all sides that the differences between the operators and men will be settled before it becomes necessary to call on other fields for shipments, which will be necessary should the deadlock continue longer than about two months.

Hope is the present chief asset of both operators and miners. Representatives of the latter will not venture predictions as to what will be the referendum decision of the miners in their vote. But are of the opinion that the operators are taking this method to bridge over the present slump in the market, as the miners themselves would not have voted to stop work. The operators content themselves with saying that they hope all matters of dissension will be settled amicably long before there is necessity to call outside aid in relieving an imminent shortage.

Reports from the Central district, which comprises Armstrong, Bedford, Blair, Cambria, Centre, Clarion, Clearfield, Elk, Huntington, Indiana and Jefferson Counties, say there is no immediate prospect of coal shortage and that the miners are equipped financially for a long struggle, should that eventuality arise, although there may be suffering in some sections.

The Government Loses a Dissolution Suit

Judges Gray, Buffington and McPherson in an opinion filed on Apr. 7 in the United States District Court dismissed the suit brought by the United States Government against the Delaware, Lackawanna & Western R.R. Co. and the Delaware, Lackawanna & Western Coal Co., for an alleged violation of the commodities clause of the United States statute. This forbids railroad companies engaged in interstate commerce traffic to transport, after May 1, 1908, any article other than timber and its products which may have been manufactured, mined or produced in whole or in part under the authority of such railroad company either directly or indirectly.

The case was considered of the highest importance by the government, as it was one of the steps planned in an effort to break up what it alleged to be a monopoly of the anthracite-coal trade.

The government's contention in the suit was that the Delaware, Lackawanna & Western R.R. Co. and the Delaware, Lackawanna & Western Coal Co. were practically one and the same corporation, and that they were violating the law referred to for the reason that the railroad company was admittedly engaged in transporting a large quantity of coal shipped by the coal company.

It was admitted at the hearing of the case in Philadelphia that the stock of the coal company was largely, if not entirely, owned by stockholders of the railroad company, but it was contended on the part of the defendants that there was a bona fide distinction between the two concerns.

It was contended on the part of the government that the maintaining of the two companies with the stock of the coal company, owned by the stockholders of the railroad company, was a mere subterfuge to evade liability under the statute.

The opinion filed by the judges goes extensively into former decisions in the United States courts, including the Supreme Court, in which the defendant companies, with other firms were involved. It is pointed out that after these decisions, which were adverse to the defendants, the Delaware, Lackawanna & Western R.R. Co., which at the time owned the stock of the Delaware, Lackawanna & Western Coal Co., placed the stock of the coal company on the market, giving preference in the sale to the stockholders of the railroad company.

The court holds that the method of the railroad company in divesting itself of the stock of the Delaware, Lackawanna & Western Coal Co. to have been a substantial compliance with the decision in the former cases.

The decision goes on to say: "No act of Congress, or judicial decision, has declared it to be illegal for any individual citizen to invest his money in two enterprises merely because the two enterprises may be closely connected."

The decision also says further that the facts before the court are to the effect that the two companies are entirely distinct and that the railroad company, which owns the mines and sells coal to the coal company, has no interest in that coal after it is mined, except the interest that it has in the business of transporting the same when it is supplied to it for transportation.

Dealing with another phase of the case, alleged violation of the anti-trust act, the opinion says there was a formal charge against both defendants under said anti-trust act, but that the oral argument left the court under the impression that these charges were not much insisted on by the government. The court's understanding was that what was desired was decision on the alleged violation of the commodities clause, upon which the dismissal was based.

The opinion concludes by saying that a decree may be entered dismissing the bill, but that the dismissal will be without prejudice to the government's right to begin a second proceeding, if the situation changes in the future, and affords the government grounds to assert that the affairs of the two corporations have become unlawfully identified.

A somewhat similar suit was recently instituted against the Lehigh Valley R.R. and its subsidiaries in the Federal Court at New York, and another government action against the Reading to separate it from the Jersey Central R.R. and other interests is in the United States Court in Philadelphia.

PENNSYLVANIA

Anthracite

Wilkes-Barre—When Charles Pamotis rode to his work upon a dangerous plane, thereby violating a rule of the Lehigh & Wilkes-Barre Coal Co., and was discharged, 1200 men and boys at the Maxwell No. 20 colliery declared a strike.

Buttonwood—The recent flood has caused idleness at the Parrish colliery since Mar. 28. The water from the Susquehanna River filled the boiler room outside, necessitating drawing the fires and consequently stopping the pumps inside, allowing such a quantity of water to accumulate that the mine has just recently been cleared sufficiently to allow a resumption of operations.

Bituminous

Uniontown—The nine coke plants and all the coal holdings of the Sunshine Coal & Coke Co. will be sold within the next few weeks. The first plant to be sold is the Cyrilla plant at Lynn Station, consisting of 140 coke ovens and 140 acres of undeveloped coal land. The date for this sale is set for May 1, and the sale of the various other plants will follow.

Washington—Fire of incendiary origin recently destroyed the fan house of the Cherry Valley mine of the Pittsburgh & Eastern Coal Co., located near Burgettstown.

Summerville—It was recently announced that Mines Nos. 5 and 6 of the Pennsylvania Coal Co. would reduce operations to three days per week until further notice. It is expected that this arrangement will cause a number of men to seek employment in other fields, as they will be unable to stand the cut in working hours. A new tippie and other improvements are to be made at No. 6 mine.

Philadelphia—Bituminous coal operators representing about 85 per cent. of the output of central Pennsylvania on Apr. 10 decided to close their mines pending the signing of a new wage agreement. Efforts to arrange a new wage scale to take the place of the one that expired Mar. 31 have been under way for several weeks.

Bernice—Activity in the recently organized mine workers' union at this place has resulted, it is said, in the discharge of a number of men. The matter threatens to create trouble in the district.

Somerset—The Berwind-White Coal Co., which conducts some of the most extensive mining operations in Somerset County, intends to comply with the demands of the miners that motors or other means be supplied so that it will not be necessary for the men to push coal cars about in the mines. To this end the company has ordered 25 motors which will be distributed throughout the several mines to be used for the purpose asked for by the miners.

Greensburg—The Jamison Coal & Coke Co., recently purchased the old Hackley homestead, containing 53 acres of coal and surface. This property is in Salem Township and adjoins the Crabtree mines.

Johnstown—First-Aid Instructor Gomer Phillips, of the Cambria Steel Co., has started the training of 10 men in mine-secure and resuscitation work. Mine-rescue stations with modern equipment have been placed in the Rolling Mill mine and in the Franklin mines of the mining department. Twenty-five miners will take the training in the use of the oxygen helmet and the pulmotor. In addition, men in the blast-furnace and other departments will be given similar instructions.

South Fork—Considerable excitement was caused on Apr. 9, when a section of Lake St., one of the most important thoroughfares of the town, dropped 9 ft. The slip, it is said, was caused by the subsidence of the surface over the workings of the Rockville Coal Co.'s mines. Other causes than that of subsidence were assigned by those connected with the coal company.

WEST VIRGINIA

Wheeling—Coal operators in West Virginia are working their mines to the fullest capacity in order to fill the general demand for fuel coming in from all sections of the country as the result of the suspension of coal production in other states. Manufacturers who were dependent on Ohio and Pennsylvania mines to supply their fuel have been forced to look to West Virginia to fill the deficiency. The principal obstacle the West Virginia operators have to overcome at the present time is an inability to secure sufficient cars to carry away their full production.

Gary—It is announced that a Fourth of July celebration will be held at Gary, which will far exceed any holiday jubilee to ever take place in the Pocahontas coal field. The program is already being discussed and plans are on foot for an occasion which promises to eclipse any other independence day celebration in the coal field. It is expected that special trains will be operated to take care of the crowds. Baseball, tennis and other outdoor games will be provided, and fireworks in the evening will form a special feature of the celebration.

KENTUCKY

Madisonville—The strike of the miners at the Kington mine continues, and the mine has now been idle for some time. W. W. Kington, manager and principal stockholder of the mine, conferred recently with city officials regarding the strike, but has announced nothing concerning the course which will be pursued. About 350 miners attended a meeting at Morton's Gap, near here recently, at which the management of the Kington Coal Co. was criticised.

Middlesboro—T. S. Webster & Co. have closed a contract to supply the Southern Mining Co. with the complete equipment needed for the new mine, incline and tippie of the Golden Ash Coal Co., at Neubert, in Harlan County, including screens, dumps, cars, drum, cables, etc., all from the Webster Mfg. Co., Tiffin, Ohio.

Greenville—Reports of lawlessness by a band of night-riders who have been dubbed "Possum Hunters" are persistent, and it is said that various acts of intimidation, all directed against nonunion miners and operators, have been committed. It is declared by nonunion operators that the object of the night-riders is to coerce them into unionizing. Union miners, however, declare that the reports of the trouble have been greatly exaggerated, and that no union man has been guilty of intimidating acts. That the trouble-makers believe themselves to be acting for the interests of the union miners is fairly apparent, although the miners themselves have declared against violence of any sort.

OHIO

Shawnee—The announcement is made that the Peabody mine, at Shawnee, which is owned by Chicago interests, has been permanently closed and the tippie and power house are being dismantled.

Columbus—According to the statement of the Ohio Board of Awards, there is no likelihood of a decrease in the rates on

premiums charged operators for their employees under the employees compensation law. It is claimed the present rates are at the lowest possible figure when the danger of the occupation is taken into consideration.

Ohio coal-mine operators in conference on Apr. 10 decided to test the constitutionality of the Green antiscreen law by filing injunction proceedings in the Federal Court to restrain state officials from enforcing the law which, the operators declare, is the cause of the suspension of work in the Ohio mines. It is expected that the suit will be filed as soon as the committee appointed and attorneys in charge can arrange it.

Steubenville—The Dexter Coal Co.'s mine at Brilliant employing about 150 men resumed operations Apr. 6 after being shut down since Mar. 31. This was the first commercial mine in the state to resume since the state-wide shutdown. The men are, however, working under the old scale, pending the referendum vote.

INDIANA

Brazil—The block-coal miners at a meeting here prepared their demands on the operators, including the weighing of coal before dumping, an advance of 5c. a ton, mine-run basis, an advance of 10 per cent. for all dead work, yardage and day work and changes in the scale of wages for machine mining and for the mining of clay.

Terre Haute—Six of the 16 demands presented by the scale committee of the miners were rejected by the Indiana operators in joint conference here. Action was deferred on the demand that operators deliver powder from magazine to working place. The demands rejected were for a differential of 7c. between pick and machine-mined coal; union-made powder at a fixed price of \$1.25 a keg; companies to pay for break-throughs, exemption of machine men from payment of blacksmithing, uniform scale for slate and dirt and payment of wages weekly. The operators opposed all demands that would increase the cost of production.

ILLINOIS

Harrisburg—The first annual first-aid contest of the Saline County Mine Safety Association will be held at Harrisburg, Ill., May 2, 1914. This meet will be of large proportions, and it is anticipated that many spectators will be present. Both single and team contests will be participated in, and the prizes will consist of medals and a silver loving cup. Hotel accommodations should be secured in advance.

Springfield—The State Mining Board of Illinois will hold a meeting at the State House, Springfield, commencing Monday, Apr. 20, for the purpose of examining candidates applying for certificates as mine managers (first or second class), mine examiners and hoisting engineers. Registration of candidates for these examinations will close at 5 p.m., Monday, Apr. 20, at the office of the Mining Board.

ARKANSAS

Fort Smith—A crowd made up of about 1000 union miners and sympathizers on Apr. 6 took possession of the Bache-Denman Co.'s mine near Midland, beat the pitboss into insensibility, roughly handled two guards and a fireman at the mine, pulled the fire from the boilers, chased away the workmen, and after raising an American flag and a banner inscribed "A Union Man's Country" from the tippie marched away led by a band. The mine had upon that day begun operating on an open-shop policy, heretofore having employed about 200 union men. It is announced that the company intends to institute the open-shop policy at its six other mines in western Arkansas and eastern Oklahoma during the coming summer and fall.

OKLAHOMA

McAlester—The state has begun taking legal steps for the purpose of mining coal with convict labor upon the penitentiary farm, the attorney-general having filed condemnation suit covering forty acres against the Choctaw and Chickasaw nations. Coal thus mined will not be sold on the open market, but will be furnished to the state for other institutions, and the money thus raised will be used in maintaining penal institutions.

KANSAS

Breezy Hill—The Sheridan Coal Co. has completed a shaft at Breezy Hill, in the Pittsburg district, and has begun operating. The shaft runs 240 ft. below the ground and is one of the deepest in the Pittsburg field.

Lyndon—Operators of Osage County have filed a complaint with the Kansas State Public Utilities Commission at Topeka, alleging discrimination by railroads entering that field in freight rates as compared to the rates from the

Pittsburg field to Kansas points. The Osage mine owners stated the rate on coal mined in that section is about 10c. higher to practically all Kansas points, where a corresponding amount of mileage is involved.

COLORADO

Denver—The supreme court on Apr. 8 issued a writ of Habeas Corpus for the release of "Mother Jones" then held a military prisoner at Walsenburg. This action was a result of a petition presented by Horace N. Hawkins attorney for the striking coal miners. This was the third application for a writ.

MONTANA

Bridger—It is announced that the resumption of commercial coal-mining operations under lease and a complete change in the management of the Bridger Coal and Improvement Co.'s properties, will take place within a short time. This is hailed as good news by residents of Bridger since the mines have been shut down for about two years.

Red Lodge—Improvements in the way of new buildings to the value of about \$50,000 are to be made at the East mine of the Northwestern Improvement Co. during the course of the next two months. These include a machine shop 36x34ft., a blacksmith shop 30x30 ft., an electrical shop 20x30 ft., and a carpenter shop 30x30 ft., all of which will be located on the south side of present carpenter shop which will be used as a car repair shop. It is expected to commence work on the new mine to be opened under the east bench the first part of June.

PERSONALS

B. F. Fluker, who recently discovered promising beds of coal on his 200-acre tract, near Malakoff, Tex., will develop that field. The vein is said to vary from 6 to 12 ft. in thickness and is from 20 to 40 ft. in depth.

James Martin has severed his connections with the State Mining Department of West Virginia to accept the position of general manager of the Paint Creek Colliery Co., and will make Mucklow his headquarters in the future.

C. L. Patterson is the new superintendent at the W. J. Rainey works at Revere, succeeding Robert Hogsett who was transferred to Grace coal plant. Mr. Patterson was formerly superintendent of the H. C. Frick Coke Co., at the Dearth plant.

Grenville Lewis, of Knoxville, Tenn., has resigned the presidency and general managership of the Ideal Block Coal Co., of Lily, Ky. He will be succeeded on or about Apr. 21 by Edward H. Cox who until recently has been manager of operations for the receiver of the La Follette Coal Iron & Ry. Co. Mr. Cox will probably reside at Corbin, Ky.

H. H. Pinkney, general superintendent of the Flat Top Coal Mining Co., has tendered his resignation from this position in order to take the general managership of the International Coal Co. of Montana, with headquarters at Bear Creek. Mr. Pinkney has held positions as superintendent and mine inspector in West Virginia for the past 14 years, making many friends and winning the respect of both operators and miners by his straightforwardness and kindly manner. It is the wish of his many friends throughout the state that he be as successful in his present undertakings as he has been in the past.

OBITUARY

James B. Davis, of Plymouth, Penn., died of heart trouble on Apr. 8 after an illness of several months. Born in Breckonshire, South Wales in 1840, Mr. Davis came to this country when 28 years of age and soon accepted the position of outside foreman at the Nottingham colliery of the Lehigh & Wilkes-Barre Coal Co. Nine years later he accepted the general superintendency of the Plymouth Coal Co., which position he occupied until he retired to private life five years ago.

Mr. Davis was recognized both in this country and abroad as an efficient executive and as a pioneer in the practice of flushing for surface support. Upon this subject he wrote several articles for the technical press of this country and Germany. He is survived by his wife and nine children.

Andrew J. Dull, a well known citizen and pioneer coal

operator of Pennsylvania, died at his home in Harrisburg, Apr. 8, from general breakdown due to old age, he being at the time of his death in his 85th year.

After his graduation from Princeton University in 1852, Mr. Dull was engaged in the construction of public works later becoming interested in the iron industry and the construction of iron mills. He also became identified with the coke industry of the Pocahontas region of W. Va. During his latter years, however, Mr. Dull gave less attention than formerly to the iron and coal business proper and as president of the Electric Ore Separator Co. gave much of this time and thought to the separation of magnetic and non-magnetic minerals. He is survived by his wife who before marriage was Judith Reynolds, of Kittanning.

CONSTRUCTION NEWS

Mater, Ky.—Work has been begun on an electrically equipped coal plant by the Elkhorn Coal Co. It is expected that from 800 to 1000 tons of coal will be shipped per day, the shipments to begin about July 1.

Greensburg, Penn.—Byrne Bros., who purchased the Mathias farm, near Malison, last year, together with several small additional tracts of coal, have a force of men erecting a tipple for the development of this field.

Viper, Ky.—The Lexington & Eastern R.R. will build five miles of branch line from Viper into the coal and timber fields of Mason Creek to reach coal and lumber developments now under way. It is stated that work will start at once.

Stone, Ky.—The Island Creek Coal Co., operating in West Virginia, has announced its intention of entering the Kentucky field. It will operate and develop several thousand acres along Pond Creek, work upon which will start within a few weeks.

Shelby, Ky.—It is announced that the Shelby Coal Co. recently organized with a capital of \$60,000, will start work immediately on a first-class coal-mining plant just up Shelby Creek, on the Sandy Valley & Elkhorn R.R. Active preparations are being made to start the initial work.

Lexington, Ky.—In an effort to rush the construction of the Yount's Fork branch of the Lexington & Eastern Ry., Brady & Mundy, the contractors, have put 200 extra men on the work in the Boone's Fork coal field. The Mineral Fuel Co. is preparing for extensive coal operations in that section.

Pikeville, Ky.—Development work is well under way on the new plant of the Sharon Coal & Coke Co. on Blackberry Creek on the Pond Creek branch of the Norfolk & Western R.R. Several million dollars will be expended in this development and the building of a first-class mining and industrial city will be a feature of the undertaking.

Whitesburg, Ky.—Another railroad line to tap the rich Boone's Fork and Elkhorn coal fields of Letcher County has been announced. This will be known as the Beaver Creek branch of the Chesapeake & Ohio, starting from Steels Creek and passing through the head waters of Beaver and Rockport creeks, penetrating rich coal and timber sections.

Hazard, Ky.—Five hundred acres of coal land have been leased from the Slomp Consolidated Coal Co. by W. N. Heath and J. G. Davis. A first-class electrically operated plant will be installed five miles north of Hazard on the Lexington & Eastern R.R., and it is expected to soon have a daily capacity of from 700 to 800 tons, and that shipments of coal will be started by June 15.

Elkhorn City, Ky.—The construction work on the 30-mile line of the Carolina, Clinchfield & Ohio R.R. from Dante, Va., through "the Breaks" of the big Sandy River to this city is being rushed with all possible speed. Owing to the trouble with the long tunnel work it is feared that traffic will not be established on this line before Aug. 1, although completion was expected to be made by May 1. This is one of the most expensive pieces of railroad ever undertaken in the South.

NEW INCORPORATIONS

Palmer, W. Va.—The Blacksburg Coal Co. has been incorporated with a capital stock of \$200,000 to develop coal land.

Charleston, W. Va.—The Griffith Coal Co. has been incorporated with a capital stock of \$1,000,000 to develop coal mines in the Sherman district.

Cullman, Ala.—The South Brilliant Coal Co. has been organized with a capital stock of \$10,000 to develop mines in Marion County. The president is Geo. H. Parker, of Cullman, Ala., the other incorporators being A. A. Griffith and O. S. Goodwin.

Uniontown, Penn.—The Ten Mile Coke Co. has been incorporated under the laws of Pennsylvania with a capital stock of \$5000. The purpose of this firm is to manufacture, sell and otherwise deal in coke.

Bowling Green, Ky.—The Premier Products Co. has been organized with a capital stock of \$300,000. The incorporators are Arthur Cobb, F. C. Mills, B. T. Calaway and F. E. Hanson, all of Cleveland, Ohio.

Sutton, W. Va.—The Strange Creek Coal & Coke Co., of Braxton County, has been organized with a capital of \$200,000. The incorporators are E. S. Areford, F. P. Truesdale, J. C. Hibbs and L. S. Masten, of Uniontown, Penn., and Levi Seigel, of Bittner, Penn.

Winnipeg, Manitoba.—The Anglo Alberta Coal Co., Ltd., has been incorporated for the purpose of mining with a capital stock of \$800,000. The head office will be in Winnipeg, and the incorporators are E. C. Comblin, R. G. Holmes, N. McKay, S. W. A. Seward and P. Morgan.

INDUSTRIAL NEWS

Pittston, Penn.—The office force of the Lehigh Valley Coal Co. at Upper Pittston, will remove from the present location to more commodious quarters at Wilkes-Barre in the near future.

Huntington, W. Va.—The Elk Horn Fuel Co., which owns a large acreage of coal land in eastern Kentucky, has announced that a 2½ per cent. semiannual dividend has been declared on its preferred capital stock, the same made payable May 1.

Freeburn, Ky.—The Turkey Gap Coal Co. announces that on or about Apr. 20, there will be an increase made in its coal shipments, that on and after that date it expects to ship 80 cars or thereabouts per day. An increase has already been made in the working force of the mine.

Washington, Penn.—By a final decree handed down by the court here Apr. 9, the Pittsburgh Coal Co. loses in its contention that fraud existed in the deed given by the late Francis L. Robin, formerly president of that company, transferring 90 acres of valuable coal land underlying the Washington Fair Grounds at Arden.

Scranton, Penn.—It is reported that it is probable that in a short time there will be a combination of three coal companies of Scranton, the Traders Coal Co., the St. Clair Coal Co., and the Robertson Coal Co. will be combined into one large corporation. It is said that W. H. Taylor, of New York, formerly of Scranton, is the leading spirit in the proposed combination.

Baltimore, Md.—A receiver for the Fairmount & Baltimore Coal & Coke Co. was recently applied for by various stockholders. That the company is insolvent is among the allegations in the bill of complaint. This firm was incorporated in West Virginia and operates a mine at Clarksburg in that state, and had an authorized capital stock of \$50,000.

Cleveland, Ohio.—A Cleveland vessel owner recently took a contract to transport 200,000 tons of soft coal for delivery at a dock at Superior during the coming summer at 30c. Shippers generally will not be in the market for another few weeks and several vessel owners are in no hurry to charter their boats for coal until they know how much ore they will be able to secure.

Washington, D. C.—Attorney General MacReynolds recently stated that the Government would appeal in the Lackawanna case to the United States Supreme Court. He said it was the first time the commodities clause had come up for judicial decision, and that the Government would, of course, take it to the highest court as the railroad would have done had the decision been the opposite.

Whitesburg, Ky.—It is reported that the recent trouble between the coal operators in eastern Kentucky and southwestern Virginia and the Louisville & Nashville R.R., and other railways entering the territory over unreasonable and discriminatory rates on northbound coal has been settled. This matter of rates has been for some time in the hands of the Interstate Commerce Commission.

Coal Trade Reviews

General Review

Anthracite continues strong and active. Bituminous dull with prevailing circulars under heavy pressure. More than enough coal coming in to supply current requirements. No signs of improvement in the immediate future.

The customary spring activity prevails in the anthracite trade. Mines are working up to the full limit and nearly all the companies report more orders for April delivery than they will be able to fill. The movement has been heavy, and the cool weather has caused an unexpected consumption so that the tonnages carried over in the bins of the consumers will be materially reduced.

Even in the face of what appears to be an indefinite suspension, bituminous quotations are under a severe test because of the effort to force coal on an already over-stocked market. The general contraction in all lines continues, and coal is now shipped only on specific orders, the general market being too uncertain to risk demurrage. Stocks at tidewater are heavy, and, in view of the light demand, conservative observers believe there is sufficient production in the nonunion districts to take care of the consumption and that the situation may continue indefinitely on the present basis. With plenty of coal coming in and large stocks on hand, there certainly is no cause for anxiety, and it will be interesting to see how operators maintain prices during the summer. In fact, buyers do not regard the situation seriously, and there is so little business being negotiated that the market is hardly quotable.

Production in the Pittsburgh district is at less than half capacity, with shipments confined entirely to contracts. Some relief is anticipated when the lake season opens, but at the present time consumers are using up surplus stocks, a great deal of which is on demurrage. It is estimated that it will take about a month to clean up the storage supplies. With practically all the mines in Ohio shut down, the market continues at a complete standstill, and the entire interest of the trade is concentrated upon the proceedings initiated to test the validity of the recent adverse legislation. Steps are also being taken toward holding another conference over the wage scale and, on the whole, the situation in Ohio has taken a decided turn for the better. Quotations at the Hampton Roads piers have been well maintained, in fact, much better than at the distributing centers; dumpings have also been heavy, and indications are that they will continue so through the balance of the month, while there is only a normal accumulation in the railway yards and a fair amount of tonnage due. The rather grave situation in the union fields has not affected the West Virginia trade in the least.

Plenty of coal is still available in the Middle-west, while operations are practically at a complete standstill and the market appears to be getting steadily weaker, with prices showing a tendency toward lower levels. The adverse conditions on prompt business are making it difficult for operators to negotiate on the new contracts as is also the uncertainty in the labor situation.

EASTERN MARKET

BOSTON

Little change in Pocahontas and New River. "Market cargoes" still a danger spot on season prices. About 65@70% of the steam contracts are reported closed. Pennsylvania grades quiet and Georges Creek dull. Anthracite coming forward freely.

Bituminous—The market for Pocahontas and New River shows no appreciable change from a week ago. "Dull" is the word everywhere and no improvement is expected for weeks to come. The base price is being fairly well maintained on spot business f.o.b. Hampton Roads but as much cannot be said for quotations at the distributing points. Cargoes continue to arrive at this end without disposition orders and prices have suffered through the effort to force supplies on a reluctant and already over-stocked trade. This has its serious aspect when considered in connection with contract business on which all the shippers are most anxious to see

the regular basis maintained. About 65@70% of all season business on Hampton Roads coals in this section is now understood to have been placed and it would be a great pity if the various agencies should have to make ruinously low prices through foolish moves on the relatively small and scattering tonnage that is yet to be closed.

There are few "bull points" in the situation here. With the large volume of Southern coal available for this territory it is very doubtful if the \$2.85 price carries through. There are some who freely predict lower prices in June and July. In some instances the price has been shaded but as a rule the operators themselves are holding the strings and are firm in their purpose not to mine coal at a loss.

The trade in the Pennsylvania coals is also very quiet. An increasing number of the larger all-rail contracts are placed each year in May and June rather than in April, so that with labor conditions more or less upset, in addition to other uncertainties, there is little doing on season orders. At tidewater there is no change. Coal is being sent to the loading piers only on special orders, the general market being too unreliable for shippers to take risks of demurrage or of softening prices.

Anthracite—Receipts continue heavy at all the ports and retail trade is remarkably brisk for the season. The cool weather has kept up with hardly a break, a condition that argues well for the demand in the summer and fall. The amount of hard coal carried over by consumers this year will be the smallest for several years.

Bituminous prices are about as follows:

	Clearfields	Cambrias Somerset	Georges Creek	Pocahontas New River
Mines*	\$0.95@1.50	\$1.25@1.65	\$1.67@1.77	
Philadelphia*	2.20@2.75	2.50@2.90	2.92@3.02	
New York*	2.50@3.05	2.80@3.20	3.22@3.32	
Baltimore*			2.85@2.95	
Hampton Roads*				\$2.80@2.85
Boston†				3.63@3.78
Providence†				3.60@3.78

*F.o.b. †On cars.

NEW YORK

Anthracite mines working full time with more April orders than can be filled. Some uncertainty regarding the retail circular. Bituminous continues heavy and with no indications of any improvement in sight.

Anthracite—While the hard-coal companies are all working up to full capacity there is a tendency to hold off in the local market, dealers hesitating to buy because of the increase in prices and some uncertainty as to what the summer discounts will be. It is understood just now, that in view of the increase of 25c. in the retail circular, the New York dealers probably will not make the customary advance of 10c. per ton on May 1. On the other hand it is stated that the Brooklyn dealers will make this advance as usual, in which event there will be a differential of 10c. per ton between the New York and Brooklyn price on prepared coal when the full winter schedule finally goes into effect.

While mines are all working full time, it is noted that off prices are occasionally obtainable on tonnages of individual coal threatened with demurrage, particularly at the lower ports. The large companies report more orders for April than they will be able to fill, and indications for the next month are generally bright although a little doubtful in tidewater business.

The good grades of pea coal are in fair demand at the upper ports where there is some scarcity due to considerable of this grade being diverted into the line business; shipments to the lower ports are not so available for the rail trade and pea coal is in plentiful supply there. About the same condition prevails on No. 1 buckwheat. The poorer grades of No. 3 buckwheat are exceptionally long, while the off qualities of No. 2 are also heavy, but somewhat stronger than either Nos. 1 or 3.

The New York market is now quotable as follows:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken.....	\$4.00	\$4.60	\$4.55	\$4.55
Egg.....	4.35	4.85	4.80	4.70@4.80
Stove.....	4.35	4.85	4.80	4.70@4.80
Chestnut.....	5.10	5.10	5.05	4.95@5.05
Pea.....	3.55	3.55	3.50	3.35@3.50
Buckwheat.....	2.80	2.80@2.90	2.50@2.75	2.35@2.75
Rice.....	2.30	2.30@2.40	2.00@2.30	1.80@2.25
Barley.....	1.80	1.80@1.85	1.70	1.40@1.75

Bituminous—Even with a suspension now nominally in effect the general contraction in the soft coal market continues. There is not a ripple of any kind in the trade, buyers refusing absolutely to take the situation seriously. There is a lot of coal coming in from the nonunion fields in West Virginia and stocks at tidewater are generally considered heavy particularly at Port Reading. Whether this was brought down on speculation or as a protection against a possible shortage, it appears doubtful if it will be required.

Even the optimists generally agree that the immediate future of the bituminous trade is shrouded in gloom. With the entire absence of any demand whatever, as a result of the depression in all lines of industrial endeavor, it is felt in all quarters that there is sufficient coal being produced to meet the reduced requirements. Under more normal conditions there would have been some spurt in the coal market by this time, but the situation may continue unchanged indefinitely without more than a slight advance in prices.

Low quotations are occasionally heard on demurrage coal. As a rule, however, there is so little business being negotiated that there is hardly any market at all and we continue nominal quotations on the same basis as for the past several weeks as follows: West Virginia steam, \$2.50@2.60; fair grades Pennsylvania, \$2.60@2.70; good grades of Pennsylvania, \$2.70@2.80; best Miller Pennsylvania, \$3.10@3.15; Georges Creek, \$3.15@3.25.

PHILADELPHIA

Anthracite trade still continues satisfactory. Steam sizes likely to improve if bituminous suspension is long continued. Soft coal quiet, with orders down to a minimum, and no indications of any change in the near future.

Anthracite—Work at the mines continues full with the exception of the Easter holidays. This, however, is to be expected at this season of the year, although coming so late, it has thrown the production back just that much. All sizes seem to be in good demand, with the call centered on egg and stove. It is understood that the market has been such that the production of egg is not sufficient to supply the demand, and considerable of this coal is being picked up. Early deliveries of this size, however, are the rule, rather than the exception. The scarcity of stove is making substitutes necessary and egg is invariably the size suggested. The market for chestnut does not appear to improve, the current output is being taken care of, but there is apparently no necessity for calling on reserves. Pea is about the only grade on which concessions are being offered; anywhere from 20 to 35c. from the circular price is being quoted in some cases. Prices at tidewater rule about the same as the week previous, with the possible exception of pea, as follows:

	Circular	Individual
Broken.....	\$4.25	\$4.35 @ 4.50
Egg.....	4.50	4.50
Stove.....	4.50	4.60
Chestnut.....	4.75	4.75
Pea.....	3.25	3.00 @ 3.10

Bituminous—In the face of what looks like an indefinite suspension at the mines, the bituminous trade shows no apparent change. As a matter of fact, conditions are even worse than reported last week. Predictions of the possibility of short supplies, meet with little interest, and there seems to be no difficulty in obtaining plenty of coal at the prevailing prices of the last two months, or even less.

BALTIMORE

Dull and uninteresting conditions mark the bituminous trade. Some uncertainty due to Central Pennsylvania suspension. Slump in slack. Anthracite trade in dull list too.

The bituminous trade is generally dull. Not only is there a decided let up in the call for prompt coal, but a noticeable slowing down in contract inquiries as well. There is little new business developing while it is difficult to keep the old trade up to normal. One element of uncertainty is the suspension in Central Pennsylvania. While this coal as a usual thing only touches the situation here to a limited degree, a suspension will create an increased demand.

A discouraging feature of the situation in West Virginia the past week was the growing weakness in slack. Sales at the mines around 70c. were recorded in some instances. Three-quarter gas, largely by reason of poor prospects in the Lake trade, was not over strong either. Sales were noted around 85 and 90 cents. No change was noted in the price list for Pennsylvania coals. Little, even of poorer grades, was to be had below \$1.05 while the best grades still command from \$1.30 to \$1.40.

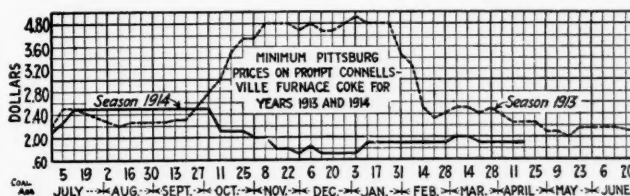
The anthracite trade here continues listless. While there has been talk of adding to the schedule to cover the Pennsylvania mine tax, some dealers have been offering coal about on the same basis as last spring.

CENTRAL STATES

PITTSBURGH, PENN.

Pittsburgh district producing less than 50% of capacity, with many mines entirely idle. Lake shipments promise to be very light up to July 1, with fairly good movement later. Coke market very dull.

Bituminous—Production in the Pittsburgh district is at considerably less than 50% of capacity, and many mines are entirely idle. This, in despite the fact the whole state of Ohio is idle and central Pennsylvania is doing practically nothing, on account of wage disagreements. Present shipments from the Pittsburgh district, limited as they are, are chiefly against contracts and hardly any coal is being bought so that no definite market is developed. It is claimed that occasional sales are made at the regular list, but it would appear that little difficulty would be experienced in securing coal at cut prices, except possibly in the case of slack, which is far from plentiful, by reason of the light production of screened coal. Consumers are using up their stocks as fast as they can, and taking as little as possible from mines. In many instances the coal stocked is subject to demurrage. The early prospects for lake shipments are poor, and the movement up to July 1 is likely to be small, but shippers are expecting that the season as a whole will not show much decrease from 1913. List prices are: Slack, 90c.; nut and slack, \$1.05; nut, \$1.25; mine-run, \$1.30; ¾-in., \$1.40; 1¼-in. steam, \$1.50; 1¼-in. domestic, \$1.55, per ton at mine, Pittsburgh district.



Connellsville Coke—The market is quiet and not overly strong, as consumption is tending to decrease rather than increase. No important transactions are reported for the past week. We repeat former quotations: Prompt furnace, \$1.90 @ 2; contract furnace, \$2; prompt foundry, \$2.40@2.50, per ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ending Apr. 4 at 356,320 tons, a decrease of 3698 tons, and shipments at 348,950 tons, an increase of 1460 tons. The production exceeded the shipments by 8330 tons.

BUFFALO

Mining suspension extending fast much to the satisfaction of the operators as there is little market for bituminous coal. Prospect of light production for the rest of this month.

Bituminous—There is no improvement in the demand as the consumer is heavily stocked up and will not be in the market for some time. At present the miners are mostly idle all through the bituminous districts of Pennsylvania and it is believed that no great amount of work will be done before May.

Reports from the Allegheny Valley mines state that the local miners' unions have refused to obey the orders of their officers to continue at work and in some instances have dismissed them and elected new officers, in order to obtain authority for suspending. This is, of course, entirely satisfactory to the operators, who are unable to sell coal at a profit. As it looks now business for some time will be confined to filling the existing contracts. It will require at least a month to use up the surplus already in consumers' hands. The future of the trade is uncertain, the most favorable feature at present being that consumption is once more greater than production.

The nominal market is weak and dull, except that there is some natural demand yet for slack, at prices based on \$2.80 for Pittsburgh lump, \$2.70 for three-quarter, \$2.55 for mine-run and \$2.25 for slack, with little doing. Allegheny Valley coal is about 25c. lower, except that the better condition of slack brings it about on a par with Pittsburgh.

Coke—The demand is not improved and so long as iron and steel remains so quiet there is little to be expected of the coke market. Dealers report the price of 72-hr. Connellsville foundry at \$4.50, which appears to be a bottom quotation.

Anthracite—The activity in the anthracite market is not great, but there is a good volume moving and shippers find it impossible to get much surplus for water shipment. The cold March and April have cleaned up the stocks in a way that was not anticipated. The opening of the lakes promises to be late so the season will probably be active; the failure of iron ore to move is holding everything else back at present.

A report from the north-shore ports of Lake Ontario is favorable to a good season, as the supply laid down there last year is well exhausted. Coal will be loaded at both Oswego and North Fair Haven for lake shipment this week. The bituminous movement from Charlotte continues all winter, but there is no activity at Sodus Point yet.

TORONTO, CAN.

Plentiful supplies and business normal. Active Lake trade in anthracite anticipated.

Trade is normal for the season with abundant supplies on hand. Dealers having anticipated the labor troubles made provisions accordingly, and have stocks on hand sufficient to last for about two months.

As soon as navigation has fairly opened large orders will be placed for anthracite for delivery by water. The usual reductions in price will be made next month, but meantime quotations remain unchanged as follows: Retail anthracite egg, stove and nut, \$8.25; pea, \$6.75. Bituminous steam, \$5.25; screenings, \$4.35; domestic lump, \$6, cannel, \$7.50. Wholesale f.o.b. cars, three-quarter lump, \$3.75@3.85; screenings, \$2.90@3.

COLUMBUS

Meeting of Ohio operators the feature of the industry during the past week. All Ohio mines are still closed and the trade is at a complete standstill. Prices unchanged.

Ohio operators met in Columbus last week and decided to test the Ohio mine-run law as soon as practicable. Action was also taken looking toward a conference between the operators and miners with a view to receiving the latter's proposition on the renewal of the wage scale. It is felt generally that considerable progress has been made toward solving the snarl in the Ohio coal trade.

The suit to test the constitutionality of the mine-run law will be brought by a Cleveland firm of attorneys in the United States court. It will be in the form of an application for an injunction to restrain the state officials from enforcing the new law after May 15 when it becomes effective on the grounds that the law curtails the freedom of contract which is guaranteed by the constitution of the state of Ohio as well as the United States. It will also be urged that the law illegally confiscates property.

There was a slight difference of opinion between the operators in Eastern Ohio and the Hocking Valley with reference to conferences with the miners. The operators from No. 8 district were loath to treat with the men until after the new law was tested. Producers from other fields believed that they could proceed with their conferences with the miners and if possible get a scale with both the mine-run and the screen basis. A conference of operators and miners is scheduled for some time soon.

The coal trade has been quiet in every respect. As no coal is being produced in this state there is practically no market or supply. Dealers stocks appear to be sufficient for all current needs up to the time of the stocking up period and consequently there is little likelihood of a fuel shortage.

Steam trade is also dull. Practically all steam users have stocked up with a supply to last for 60 to 90 days. Their fuel requirements are not very large because of the dullness which prevails in the manufacturing line. Railroads have taken off many trains and as a result their fuel requirements are decreasing right along.

What quotations are being made in the Ohio fields are as follows:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Domestic lump.....	\$1.45 @ 1.35	\$1.50 @ 1.40	\$1.40 @ 1.35
1/4 inch.....	1.30 @ 1.25	1.20 @ 1.15	1.35 @ 1.30	1.30 @ 1.25
Nut.....	1.25 @ 1.20	1.30 @ 1.25	1.25 @ 1.20
Mine-run.....	1.15 @ 1.10	1.10 @ 1.05	1.15 @ 1.10	1.15 @ 1.10
Nut, pen and slack..	0.90 @ 0.85	0.90 @ 0.85	0.80 @ 0.75
Coarse slack.....	0.80 @ 0.75	1.00 @ 0.95	0.80 @ 0.75	0.70 @ 0.65

CLEVELAND

Spot coal heavy at low prices. Demand for prompt Pocahontas good in the smaller towns, but slow with local dealers. Lake chartering heavy during the week.

Since shipments from the mines have stopped a few grades of coal are beginning to disappear from the spot market although prices are hardly altered. The only advance noted during the week was a slight premium on Pocahontas egg among dealers in the smaller towns about Cleveland. Lump is plentiful.

The retail dealers of Cleveland are accumulating all the hard coal they can. Few yards are in a position to store as much anthracite now as they ought to because they have surplus steam coal in the bins.

During the last week vessel capacity to transport 600,000 tons of bituminous coal from Ohio ports to Superior was chartered at 30c. There are offers of 27½c. for the same service, but those who are making them have not actively sought boats recently. With one or two exceptions the lake coal shippers are not considering chartering for another two weeks or more. The stocks at Duluth-Superior docks were estimated at 2,000,000 tons the first of the month. Docks at the upper lake ports are in about the same shape and will not need coal until well into June or early July.

Navigation opened officially Apr. 15, but owing to the channels at the Straits of Mackinac and Sault Ste. Marie being filled with ice, boats did not leave for upper lake ports. It will be Monday or Tuesday, Apr. 20 or 21, before it will be possible for ships to pass these points.

The local market for slack was a little stronger toward the last of the week and was even more so early this week. Coarse coals are still a drag on the market. There has been some inferior coal, from mines that usually ship other markets, that could not be moved.

Fairmount shippers sold a large amount of slack a month ago at 75c. This has come into the market during the last few weeks and has been sold at a loss of 5 to 10c. The same slack can be bought at 65c., which makes it cost \$1.80 here, 5c. over the market. Three-quarter No. 8 is being offered at \$1.20 at the mines for shipment and mine-run at \$1.10. The freight rate is 90c. Middle district coal for shipment, freight rate 70c., is being offered at \$1.30 for three-quarter and \$1.20 for mine-run.

Sales agents of Ohio mines are meeting with considerable difficulty closing contracts. The buyers want a definite price which coal operators of Ohio are unable to make. The mining scale and spotting charges are still to be established and will effect the price. The consumers are not willing to buy subject to advances equal to the increased expenses possible through these sources. They point to the settlement of the western Pennsylvania wage question and explain they can buy on a definite price from that field.

The spot prices f.o.b. Cleveland are as follows:

	Pocahontas	No. 8	Middle District	Youghiogheny	Fairmount
Lump.....	\$2.95*				
Lump, 1 1/2-in.				\$2.50*	
Lump, 2 1/2-in.					\$1.90@2.00
Lump, 3-in.		\$1.90	\$1.90	2.40*	
Egg.....	2.95*				
Mine-run.....	2.60*	1.80	1.80	2.30*	
Nut.....		1.85		2.20*	
Slack.....	2.60*	1.75	1.65@ 1.70	1.90	1.75

* Indicates price for shipment.

CINCINNATI

Market weak but steady. Dealers report that most buyers have large tonnages stored. Outcome of West Virginia conference between operators and miners being anxiously awaited.

Uncertainty as to the outcome of the conference of operators and miners in the West Virginia field is occupying the attention of the local trade. Local managers are of the opinion that an amicable arrangement will be arrived at. There is little new in the market in the way of prices and but a fair amount of business is being transacted although dealers confidently look for a sharp demand within the next ten days or two weeks. The quiet attitude is not causing any considerable alarm as this is the season between buying periods. But little new business is being offered, the majority of coal now being moved, representing contract orders. There is some coal on the tracks here awaiting delivery, but much less than two weeks ago.

Dealers in Pocahontas are the only ones that report a good movement and while there is no heavy demand for the same, still the market is steady with prices firm. Pennsylvania mines are operating from three to five days a week and are doing this only to keep their men at work. They state that they have plenty of coal on hand with a rather light demand. New River domestic coal is reported as sold up for the month of April with an active demand for later. Good prices prevail on New River.

DETROIT

Consumers showing some anxiety over the labor situation. Ohio grades slow with West Virginia active. Large tonnages of anthracite moving.

Bituminous—Several large contracts have been closed, three-quarter lump being negotiated at \$1.10 per ton, with mine-run at \$1, and, occasionally, \$1.05. Slack coal is in good demand at 90c. for spot shipments and 85c. on contracts for the new year.

Ohio coals are slow, the trade believing that it is hardly worth while to negotiate for these because of the unsettled conditions there. Pocahontas grades are active and Kentucky coals are arriving in greater abundance than ever before. Manufacturers are beginning to evince some anxiety over the situation and are taking pains to ascertain whether shipments on contracts will be maintained. The outlook is much better on steam coals but is less favorable on the domestic grades, the demand for which is weak.

Anthracite—There is a great deal of activity evident in hard coal, dealers making every effort to get their full quota of all sizes at the minimum April circular. No track coal is to be found, immediate disposition being made upon arrival, some dealers even paying a premium of 10c. per ton in their anxiety to obtain the coal.

Coke—Coke is moderately active, contracts for Connells-ville being closed at \$3, with Semet Solvay at \$3.25 and gas house at \$2.90, all f.o.b. ovens.

HAMPTON ROADS

Week's dumpings very good. Large shipments to both West Indian and Italian ports. Prices on all grades firm.

Dumpings over the piers at Hampton Roads for the week have been heavy. The largest cargo went into the U. S. Collier "Orion" this vessel taking 11,329 tons from the piers of the Virginian Ry. in the short space of 7 h. and 55 min. The demand for run-of-mine, both Pocahontas and New River, is still excellent and the indications are that there will be a good movement over tidewater piers all through the month. Although there has been some demand for prepared coal there is practically no call for the high volatile grades.

There has been no change in prices during the week. Export cargoes have gone to Naples, Kingston, Curacao, Leghorn, Canal Zone, Bridgetown, St. Lucia, Port Antonio, Havana and Santiago. The accumulation in the railway yards is about normal with a fair amount of tonnage due.

LOUISVILLE, KY.

Freezing weather has helped the retail market to some extent, but not much business has been handled. A growing scarcity of screenings; prices rising.

Unseasonably cold weather during the past week kept the retailers busy delivering small orders as many domestic consumers found it necessary to have fuel after expectation of any such a need had passed. This naturally did not make up any great total volume of business, and while the operators received a few orders, the market was dull. As yet there is no indication of a stocking movement in any section, despite the rather grave labor situation, and prospects are for a slow domestic market, and a correspondingly tight steam market, for some time to come.

The short production of the prepared grades has at last resulted in a marked scarcity of screenings, and prices have stiffened lately, especially on the Western Kentucky product where curtailed operations have made the shortage quite acute. The railroads are taking practically no mixed coal from this district just now, making pea and slack, hard to get, with nut and slack also scarce, while the market generally is stronger than for some time. Western Kentucky sales at 75c. a ton f.o.b. mines are reported, which is nearly as high as the better Eastern Kentucky grades, although, of course, the lower freight rate cuts a figure in this price. Domestic prices are stationary at the low level which has been maintained for some weeks.

SOUTHERN AND MIDDLE-WESTERN

BIRMINGHAM

Some orders for domestic lump booked at spring prices but market is very quiet. Steam coal continues dull and furnace and foundry coke show little change. Practically nothing doing in pig iron. Car supply adequate.

Even though all operators have put the spring prices into effect, the retail dealers are holding off buying, believing that the regular schedule will not be adhered to, and that they will be able to buy at a reduced price later. However, it is probable that no reduction in these prices will be made, even with a fair business. Some of the retailers have booked orders for spring and summer shipment, but the tonnage has not been as large as usual during the first two weeks of April. The market on steam coal still continues quiet, but the prices are not being reduced, except in a few rare instances on demurrage coal.

The manufacturers of coke state that there is practically no business to amount to anything either on furnace or foundry coke. Blacksmith coal, however, is in a satisfactory condition. All furnaces report small sales of pig iron, with no immediate relief in sight. The car supply is sufficient to take care of the present business.

INDIANAPOLIS

Mines have been gradually closing since Apr. 1, partly for repairs and partly because of the heavy stocks. Will probably resume sometime this month.

While the miners of the state have been willing to continue at work, pending the fixing of a new wage agreement, the mines have gradually been shutting down since the old contract expired Apr. 1. Most of the large consumers in the state have stocked up heavily with coal and can give no more orders to the mines. As there is also considerable coal in cars at the mines, junction points and terminal yards, this has been available for current trade. Owing to the urgent demands of the public utilities and other large consumers, they have had preference and retail yards have had to wait. As a result some of them have run out of Indiana coal, particularly the domestic grades, the demand for which has kept up on account of touches of freezing weather.

Another reason for closing down of the mines was the necessity for repairs caused after steady operations for two months practically at full capacity, on account of a stretch of several weeks of snow and cold. While the mines are closed, operators are busy renewing contracts. This is progressing satisfactorily and practically on the same basis as last year. A clause in the contracts protects the operators from loss in case of an advance in wages. Prices at the mines have not been materially changed. Retail quotations in this city continue on the basis set Sept. 20 last, although summer prices will soon prevail, after the new wage scale is settled.

CHICAGO

Market dull with many uncertainties. Despite the general curtailment, there has not been sufficient business to absorb the surplus tonnages accumulated in anticipation of the suspension. Dealers' stocks are low, but buying is light even at the April discount.

A great deal of uncertainty has developed in the smokeless market as a result of the tendency on the part of jobbers and agencies to speculate on this grade. That, and almost violent fluctuations in the spot market has made it exceedingly difficult for the companies to prevail upon buyers to sign up contracts. The larger agencies are holding determinedly for \$1.25 for mine-run, but there is a great deal of coal available in the market at much less than that figure. Spot prices are generally about \$1, and considerable business has been negotiated at 80c. with some down to 75c. These fluctuations are naturally affecting contract negotiations adversely.

There has been little coal come in from the Hocking district that arriving being quickly disposed of. Splint coal is slightly stiffer as the result of restricted shipments, and the same conditions prevail on Eastern Kentucky which is quoted at \$1.75. Particular disappointment is felt over the screening situation, a strong market having been anticipated during the spring and summer on this grade. It is rather remarkable, but nevertheless it is a fact that with practically all mines shut down the price tendency still continues downward.

The only department in which any improvement is noticeable is in the byproduct coke, several fairly good contracts having been closed. Gas house coke for prompt shipment is weak; although nominally it sells at \$4.25, sales are reported at reductions of 10 and even occasionally 20c. per ton. Furnace and foundry coke are dull.

The Chicago market is now quotable on the following basis:

	Springfield	Franklin Co.	Clinton	W.Va.
Domestic lump.....	\$2.07	\$2.30@2.40	\$2.12	
Steam lump.....	1.97		1.97	
Egg.....		2.30@2.40		\$3.65
Mine-run.....	1.87	2.15@2.25	1.87	3.30
Screenings.....	1.67	1.85@1.95	1.62	

Coke—Connellsville and Wise County, \$5 and \$5.25; by-product egg, stove and nut, \$4.45; gas house, \$4.25.

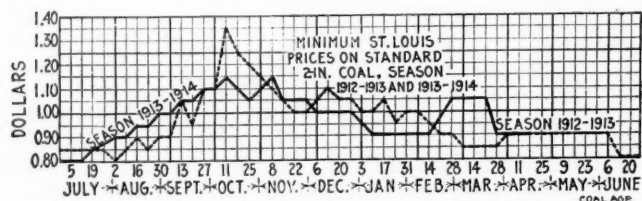
ST. LOUIS

Operations at a complete standstill. Plenty of coal available and prices continue weak. Colder weather stimulates demand.

Trade conditions in and around St. Louis are absolutely at a standstill. Over in the Illinois field a few cooperative mines are working and here and there a railroad mine, and a few commercial mines. These operations are all, as a rule, in the fifth and ninth districts, which shows that the

attitude of the operators in these districts is to cater to the miners instead of holding out with the producers from the other districts. In the Williamson-Franklin field a few mines started up and worked for a day or two, but operations are practically suspended now. There is plenty of coal on track, especially lump and egg, the only scarcity being for the nut and steam sizes.

In spite of the possibility of a prolonged shut down, coal is still being sold below or at the cost of production in all fields. Standard 2-in. lump is offered as low as 85c. and mine-run at 80c. Screenings, however, are selling for as much as mine-run, and will likely be worth as much as lump in the course of a few days. Franklin County coal is down to \$1.15, while the average price for Cartersville is \$1.25. The low Franklin County price is made by a couple of jack-legged operators in that field the regular circular for that grade being from \$1.25 to \$1.35 from the better operations.



A small tonnage of anthracite has moved into the St. Louis market in the past week, but the smokeless and coke trade are at a standstill. During the past week the weather has been wet and chilly, causing an unusual demand at this season upon the retailers, who have found business good in small lots only. The future as regards local conditions is an uncertainty.

There is no material change from the prices of last week, with the exception of screenings, which in the Standard field are bringing 75 to 85c., and in the Cartersville field 90c. to \$1, with little offering. There is no washed coal on the market at all.

KANSAS CITY, MO.

Market continues practically unchanged, although showing a slightly improving tendency.

Unseasonable weather has stimulated domestic business to some extent and most of the operators in this field were a trifle more active than they had expected. The outlook is still serious for shaft operators, shovel mining in the Pittsburgh field being at its height, with weather conditions favorable for this class of work. The shaft operators, however, are disposing of most of their output without serious difficulty at present, steam demand showing particular strength.

PORTLAND, ORE.

Prices on Utah and Rock Springs coals in wholesale lots reduced. Retail business light now that mild weather has set in.

Local coal dealers received word this week that the price on Utah and Rock Springs coal have been reduced on car-load lots. The reductions are 50c. per ton on Utah lump, bringing the price to \$2.25 per ton, and to \$1.75 per ton for egg coal. The reduction on the Rock Springs coal is 25c. per ton on lump and 50c. on nut, leaving the price at \$2.50 for lump and \$2 for nut. While these reductions have not yet affected retail prices, it is supposed that they will mean the announcement of summer prices in the near future. The weather being mild, with summer rapidly approaching, the demand for coal for domestic purposes is light.

FOREIGN MARKETS

GREAT BRITAIN

Apr. 3.—The market continues to gain strength, and all classes of coal are well booked for early shipment. Sellers are firm in their ideas of price for forward loading, as it is anticipated that a continuance of the strike in Yorkshire will result in a heavier demand for Welsh Coal. Prices are approximately as follows:

Best Welsh steam.....	\$4.56	Best Monmouthshires.....	\$4.14
Best seconds.....	4.32	Seconds.....	4.05
Seconds.....	4.23	Best Cardiff smalls.....	2.73
Best dry coals.....	4.20	Seconds.....	2.58

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are net f.o.b. Newport; both exclusive of wharfage, and for cash in 30 days.

COKE

Special foundry.....	\$6.36@6.72
Good foundry.....	5.52@6.00
Furnace.....	4.92@5.28

PRODUCTION AND TRANSPORTATION STATISTICS

THE CAR SITUATION

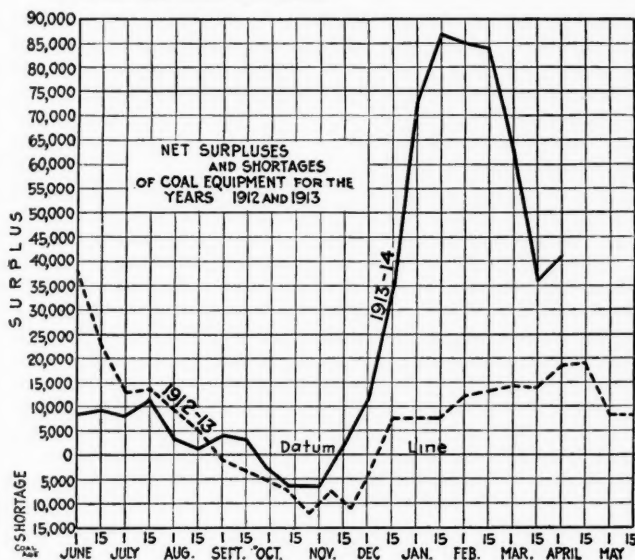
American Ry. Association reports surpluses and shortages of coal equipment for two weeks ended Apr. 1, as follows:

	Surplus	Shortage	Net*
New England Lines.....	668	0	.668
N. Y.; New Jersey, Del.; Maryland; Eastern Penna....	3,579	567	3,012
Ohio; Indiana; Michigan; Western Pennsylvania....	9,803	0	9,803
West Virginia, Virginia, North & South Carolina....	6,677	0	6,677
Kentucky, Tenn.; Miss.; Alabama, Georgia, Florida....	6,692	0	6,692
Iowa, Illinois, Wis., Minn.; North & South Dakota....	4,478	11	4,467
Montana, Wyoming, Nebraska.....	1,524	0	1,524
Kansas, Colorado, Missouri, Arkansas, Oklahoma....	2,406	23	2,383
Kansas, Colorado, Missouri, Arkansas, Oklahoma....	408	14	394
Texas, Louisiana, New Mexico.....	4,428	0	4,428
Oregon, Idaho, California, Arizona.....	4,428	0	4,428
Canadian Lines.....	392	0	392
Total.....	41,055	615	40,440

	Dec. 1	Dec. 15	Jan. 1	Jan. 15	Feb. 1	Feb. 15	Mar. 1	Mar. 15
Surplus.....	17,621	36,435	72,535	87,149	85,489	84,775	64,822	39,133
Shortage.....	5,095	2,295	57	789	102	239	1,394	3,282

Net*..... 12,526 34,140 72,478 86,360 85,387 84,536 63,428 35,851

*Bold face type indicates a surplus.



COAL SECURITIES

The following table gives the range of various active coal securities during the week ending Apr. 11.

Stocks	Week's Range			Year's Range	
	High	Low	Last	High	Low
American Coal Products.....	84	84	84	84	84
American Coal Products Pref.....	104½	104½	104½	106	104
Colorado Fuel & Iron.....	32½	30	30	34½	28½
Colorado Fuel & Iron Pref.....	155	155	155	155	155
Consolidation Coal of Maryland.....	102½	102½	102½	102½	102½
Island Creek Coal Com.....	49½	46½	49½	49½	46½
Island Creek Coal Pref.....	86½	85½	86	86	85
Lehigh Valley Coal Sales.....	170	150	165	165	150
Pittsburgh Coal.....	21	20½	21	23½	17½
Pittsburgh Coal Pref.....	92	91	91	93½	86
Pond Creek.....	18½	17½	18½	18½	17½
Reading.....	166½	164½	165	172½	161½
Reading 1st Pref.....	88	88	88	89	87½
Reading 2nd Pref.....	90	90	90	93	90
Virginia Iron, Coal & Coke.....	50	50	50	52	40
Bonds	Closing Bid Asked			Week's Range	
				or Last Sale	Year's Range
Colo. F. & I. gen. s.f.g. 5s.....	97	98½	98	Mar. '14	91½ 99
Colo. F. & I. gen. 6s.....	104	107½	107½	June '12	104 107½
Col. Ind. 1st & coll. 5s. gu.....	76½	73	78½	Apr. '14	76½ 82
Cons. Ind. Coal Me. 1st 5s.....	88½	73	73	Mar. '14	73 79
Cons. Coal 1st and ref. 5s.....	89½	92	89	Mar. '14	89 89
Gr. Riv. Coal & C. 1st g 6s.....	91	99½	99½	Feb. '14	99½ 99½
K. & H. C. & C. 1st s f g 5s.....	91	98½	102½	Apr. '06	91 93½
Peach. Con. Coll. 1st s f 5s.....	91	93	93	Mar. '14	93 93½
St. L. Rky. Mt. & Pac. 1st 5s.....	88½	Sale	88	88½	84 88½
Tenn. Coal gen. 5s.....	78	80	80½	Mar. '14	77 82
Birm. Div. 1st consol. 6s.....	100½	102½	103	103	97½ 103½
Tenn. Div. 1st g 6s.....	102	102½	102	102	101½ 103
Cal. C. M. Co. 1st g 6s.....	102	103	102	Mar. '14	101 102½
Utah Fuel 1st g 5s.....	101	101½	101½	Mar. '14	101½ 101½
Victor Fuel 1st s f 5s.....	75	80	80	May '13	75 80
Va. I. Coal & Coke 1st g 5s.....	92½	93	93	Apr. '14	92½ 95

Index of Coal Literature

We will furnish a copy of any article (if in print) for the price quoted. Where no price is quoted, the cost is unknown. Inasmuch as the papers must be ordered from the publishers, there will be some delay for foreign papers. Remittance must be sent with order.

ACCIDENTS AND THEIR PREVENTION

Monthly Statement of Coal-Mine Fatalities in the United States, December, 1913, with Revised Figures for Preceding Months. Albert H. Fay. Bureau of Mines; 23 pp.

The Prevention of Accidents in Mines. Chas. P. McGregor, Coal & Coke Op., Mar. 12, 1914; 2 pp. 20c.

BLASTING, EXPLOSIVES

Heat Test as Applied to Explosives. (First report of the Departmental Committee.) Iron Coal Tr. Rev., Mar. 30, 1914; 1½ pp. 40c.

Permissible Explosives Tested Prior to Jan. 1, 1914. Clarence Hall. Bureau of Mines, Tech. Paper 71; 7 pp.

Production of Explosives in the United States During the Calendar Year 1912. Albert H. Fay. Bureau of Mines, Tech. Paper 69; 4 pp.

Self-Testing Electrical Shot-Firer. Coll. Guard., Mar. 13, 1914; ½ p., illus. 40c.

BORING AND TUNNELING

Air-Hammer versus Rotary Drills. Pol Dunaime. Coll. Engr., April, 1914; 3 p. 35c.

Air Consumption and Maintenance Cost of Rock Drills. Chas. C. Hansen. Comp. Air Mag., March, 1914; 1¾ pp., illus. 20c.

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Commercial Development of the Briquetting Industry. Chas. T. Malcomson. Coal Dealer, April, 1914; 1 p. 20c.

Use of Napthalene in Coal Briquettes. Berg. Grahn. (Translated from Glückauf.) Coll. Engr., April, 1914; ½ p. 35c.

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Moistening Coal Dust. Jas. L. Davidson. Coll. Engr., April, 1914; 2½ pp. 35c.

German Coal-Dust Precautions. Dr. Tornow. Coll. Engr., April, 1914; 10½ pp., illus. 35c.

COKE

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A Large Koppers' Regenerative Coke-Oven Plant in Great Britain. Coal Age, Mar. 28, 1914; 1½ pp., illus. 10c.

The Automatic Control of Byproduct Coke-Oven Plants—IV. (Thermometers and Pyrometers.) A. Thau. Gas Wld., Mar. 7, 1914; 1¼ pp., illus. 40c.

The Manufacture of Byproduct Coke. T. V. Salt. Jour. West. Soc. of Engrs., February, 1914; 30 pp., illus. 60c.

Vertical Retorts and Conveying Machinery at Leicester. Gas Wld., Mar. 28, 1914; 1½ pp., illus. 40c.

COMPRESSED AIR

Moisture in Compressed Air. Frank Richards. Power, Apr. 14, 1914; 2 pp., illus. 15c.

Some Efficient Compressed-Air Plants in Coal Mines. S. W. Symons. Coal Age, Mar. 14, 1914; 3¾ pp., illus. 10c.

The Efficiency of an Air Compressor in Mine Operations. Min. & Eng. Wld., Mar. 14, 1914; 1 p. 20c.

DRAINAGE, PUMPING, ETC.

A Mammoth Mine Pump. (Built for a service of 2500 gal. per minute against a 750-ft. vertical head.) Coal Age, Apr. 4, 1914; 1¼ pp., illus. 10c.

Combined Air-Lift and Pumping System. Lewis Jones. Coal Age, Apr. 4, 1914; 2 pp., illus. 10c.

Electric Pumping at Tilmanstone Colliery. Coal Age, Apr. 4, 1914; 3½ pp., illus. 10c.

Stripping a Mine by Hydraulic Methods. P. J. McAuliffe. Coal Age, Apr. 4, 1914; 1 p., illus. 10c.

Self-Starting Motors for Mine Pumps. W. H. Easton, Coal Age, Apr. 4, 1914; 1 p., illus. 10c.

The Proper Choice and Care of Mine Pumps. C. W. Crawford. Coal Age, Apr. 4, 1914; 1 p. 10c.

The Principle of the Centrifugal Pump. J. D. Cone. Coal Age, Apr. 4, 1914; 2 pp., illus. 10c.

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Brush-Shifting Polyphase Motor. Coll. Engr., April, 1914; 1 p., illus. 35c.

Electric Circuit Testing. Sci. & Art of Min., Mar. 28, 1914; 2 pp., illus. (to be continued). 40c.

Electric Switches for Use in Gaseous Mines. H. H. Clark and R. W. Crocker. Bureau of Mines, Bull. 68; 31 pp., illus.

Electrical Equipment for Low-Energy Consumption. (Paper read by J. Glynn Williams before the Assn. of Min. Elec. Engrs.) Iron Coal Tr. Rev., Mar. 6, 1914; ¾ p. 40c.

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Mine Substations—II. Motor-Generator Sets vs. Synchronous Converters. Will M. Hoen. Proc. Amer. Inst. Elec. Engrs., April, 1914; 6¼ pp., illus.

Mine Substations—I. Their Construction and Operation. H. Booker. Proc. Amer. Inst. Elec. Engrs., April, 1914; 5½ pp.

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GENERAL

A Triangulation Survey of the Fairmont Region. A. W. Hesse. Coal Age, Apr. 11, 1914; 3¾ pp., illus. 10c.

The American Coal Industry; Its Risks, Reserves and Trust Relations. A. T. Shurick, Eng. Mag., April, 1914; 3 pp. 35c.

Austro-Hungarian Iron, Steel and Coal Industry in 1913. Iron Coal Tr. Rev., Mar. 13, 1914; ¾ p. 40c.

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Burning Pulverized Coal. (Experience of the American Iron & Steel Co. in burning pulverized coal in its metallurgical furnaces.) Iron Tr. Rev., Apr. 9, 1914; ½ p. 25c.

Coal Industry of the British Empire. (From the annual Statistical Abstract for the British Empire issued by the Board of Trade.) Iron Coal Tr. Rev., Mar. 13, 1914; ½ p. 40c.

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Flooded Coal Mine in Illinois. Frank Rosbottom. Coll. Engr., April, 1914; 1 p. 35c.

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Principles of Efficiency for Mine Management. (Abstract of paper read by G. A. Collins before the Pacific Northwest Soc. of Engrs.) Min. & Eng. Wld., Apr. 4, 1914; 3 pp. 20c.

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The Ching Hsing Coal Basin. Edward Di Villi. Min. & Sci. Press, Apr. 4, 1914; 1 p., illus. 20c.

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Some Advantages of the Electric Hoist over the Steam or Air Hoist. K. A. Pauly. Gen. Elec. Rev., April, 1914; 6 pp., illus. 30c.

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Gob Fire at a West Yorkshire Colliery. (Paper read by H. F. Smithson before the Natl. Assn. of Coll. Mgrs.) Iron Coal Tr. Rev., Mar. 6, 1914; 2 pp. 40c.

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MINE GASES, TESTING

The Sampling and Examination of Mine Gases and Natural Gas. Geo. A. Burrell and Frank M. Seibert. Bureau of Mines, Bull. 42, illus.

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A Brick Tipple. W. G. Burroughs. Coll. Engr., April, 1914; 2¼ pp., illus. 35c.

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The I. & S. C. M. Co.'s Plant at Issaquah, Wash. (Describes an unusually effective installation for handling and treating the low-grade Pacific Coast Fuels.) Coal Age, Apr. 11, 1914; 3 pp., illus. 10c.

RESCUE, SAFETY APPARATUS

Converting the Foreman to the "Safety First" Idea. S. C. Reynolds. Coal Age, Mar. 28, 1914; 1½ pp. 10c.

Methods of Rendering First-Aid. (Discussion of the most effective methods of rendering first aid in the more frequent types of mine accidents.) A. S. Snyder. Coal Age, Mar. 28, 1914; 1¾ pp., illus. 10c.

Some New Types of Rescue Apparatus. (Series of papers read before the Midland Inst. of Min. Civil & Mech. Engrs.) Coll. Guard., Mar. 27, 1914; 1¾ pp., illus. 40c.

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